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Astronomical Observations made at the Royal Observatory, Greenwich, in the Year 1847. Under the Direction of GEORGE BIDDELL AIRY, Esq., M.A., Astronomer Royal.

No one has ever sailed down or up the Thames, and surveyed the stately domes and colonnades of Greenwich Hospital, without admiring the background which the wooded heights of Greenwich Park give to the landscape, and the contrasting architecture of the brick towers and minarets of the Royal Observatory, placed on a commanding height in the prolongation of the middle area of the Hospital, and thus terminating the vista. But few of these voyagers, we suspect, take time to consider that the British Navy owes an important part of its efficiency not less to the Observatory than to the Hospital,—that Humanity is interested in the former as well as in the latter,—that the sovereign who foresaw the ultimate consequence to certain and safe Navigation of a good system of Astronomical observations, was in this instance as wise and patriotic as he who provided a magnificent asylum for the helpless old age of those who had already often owed the preservation of life to the patient vigils of the astronomer.

The fortunes of Greenwich Park have been as varied as those of most places the property of the crown in the vicinity of a capital. The manor of East Greenwich* was

an unenclosed waste until the reign of Henry VI., when a charter conveying 200 acres of it was given to Humphry, Duke of Gloster, the king's uncle, and to Eleanor his wife.

This curious charter (of which a copy is now before us) is dated 26th of March, 1437.* Perhaps the foundations of Duke Humphrey's tower still exist; at all events, it is certain that the Observatory is built on the same site, being a position of no inconsiderable strength. It is a kind of peninsula jutting out toward the Thames from the general level of Blackheath and the southern district of the Park, with which it is connected by a tolerably narrow isthmus, whilst the

* Rot. Patent, 15 Hen. 6., M. 7. As a specimen of the quaint latinity, we quote the following permission:—"Muris petra et calce includere et firmare, et muros illos kernellare,¹ battellare, et turrellare, ac quandam Turrim infra Parcum prædictum similiter petra et calce de novo² construere, edificare, et tam turrim illam sic de novo constructam et edificatam quam dictum manerium sive mansionem ut præmittitur inclusum, firmatum, kernellatum, imbattelatum, et turrellatum, tenere possint sibi et hæredibus suis prædictis in perpetuum," &c. Copied from the original in the Tower.

¹ Kernellare, from *creneaux*, (Fr.) to make battlements for defence.

² Hence it appears that there must have been some still older structure.

* Deptford was West Greenwich.

ground slopes rapidly in every other direction from the little table-land occupied by the Observatory. The natural strength of the situation has evidently been increased by lofty retaining walls on the north, south, and west sides—sustaining both the building and a part of the pleasure ground.* This gives to the place an air of great seclusion and privacy, as well as apparent strength, not less suitable to its present than to its original destination—freedom from interruption and indiscreet curiosity being an inestimable advantage in an institution dedicated to such purposes in the midst of one of the most public resorts in the neighborhood of the metropolis. Mr. Francis Baily states,† on the authority of some MS. notes in a copy of Maskelyne's "Observations," that the tower was repaired or rebuilt by Henry VIII. in 1526; "that it was sometimes the habitation of the younger branches of the royal family, sometimes the residence of a favorite mistress, sometimes a prison, and sometimes a place of defence. Mary, fifth daughter of Edward IV., (betrothed to the King of Denmark) died at the Tower in Greenwich Park, in 1482. Henry VIII. visited "a fayre lady whom he loved" here. In Queen Elizabeth's time it was called *Mirefleur*. In 1642, being then called Greenwich Castle, it was thought of so much consequence as a place of strength, that immediate steps were ordered to be taken for securing it. After the Restoration, Charles II., in 1675, pulled down the old tower, and founded on its site the present "Royal Observatory." It should be noticed, that there was a distinct royal residence on the same manor, between Duke Humphrey's Tower and the river, called *The Pleasaunce*, which was frequented by Queen Elizabeth and other sovereigns.

Astronomy is a subject so palpable in its results, and conversant with facts so astounding, yet so plain, that there is scarcely any age or period of the world in which most men have not, at some time or other of their lives, been drawn to it with a strong feeling of interest and awe. Perhaps some readers may be able to sympathize with our juvenile recollections of a time when the towers and walls of Greenwich Observatory seemed to us to enclose a profound yet tempting mystery, which we hardly dared

hope ever to explore; or when we traversed the weary diameter of Paris to gaze on the Observatory built by Cassini, and directed by Arago, or trod with respect the very stones of the *Rue du Bac*, at that time inhabited by Laplace. Considering that the practical details of observatories are witnessed by comparatively few persons, and that of those so privileged still fewer can pick up anything like an intelligent idea of what is going on, and how the astronomical paraphernalia they behold are made to yield a knowledge of the facts which they read of in books at home, we have thought that an attempt might be made to make this branch of knowledge accessible to all who have any acquaintance with its elements, and to reveal some of the mysteries of the art and practice of an astronomical observer, to many who may never think of becoming either profound astronomers or practiced observers themselves.

We propose, therefore, in the present article, to consider, *first*, what it is which the practical astronomer professes to determine; *secondly*, to notice the instruments which he uses in order to make these determinations; and, *thirdly*, to attempt a sketch of the economy and management of an Observatory, its *personnel*, as well as its *matériel*,—which we shall illustrate by a more especial reference to the National Observatory of Greenwich. The two first heads we will make as brief as may serve to a due understanding of our third and principal topic.

I. Practical astronomy has two great branches. That to which the telescope may be said to have given birth; and that which is *comparatively* independent of it. Before the invention of the telescope, Copernicus had announced the true system of the world,—namely, that the sun is the centre of a planetary system, of which the earth is one member, with the moon circulating round it; and that the fixed stars are altogether independent, and placed at a vastly greater distance. The periods and comparative distances of all the principal planets were known; as well as the deviation of the orbits of some of them from a circle; and a certain approximation was made to the singularly irregular form of the lunar path; eclipses could be calculated with tolerable accuracy; latitudes and longitudes roughly ascertained; and even such delicate phenomena as the apparent displacement of the heavenly bodies by refraction, and the general excessively slow motion of the fixed stars relatively to a point altogether imagin-

* An accurate map of the grounds and buildings has been constructed and engraved by the present Astronomer Royal.

† Life of Flamsteed, p. 39, note.

ary, termed the *equinoctial point*, had been clearly discovered and imperfectly measured.

But when the telescope gave to man almost a new sense, and enabled him to examine objects at a distance, with the advantage of a vast magnifying power, a new department of practical astronomy arose. Astronomers had hitherto only seen the rude outline of our own system, and the still ruder landmarks of the starry firmament. The telescope not only revealed thousands, nay millions of bodies, hitherto unseen because invisible, but it displayed complications of arrangement and feature, which gave as it were a *coloring* to the broad natural outlines with which hitherto the astronomer had to content himself. The moons of Jupiter and Saturn, the rings of the latter, and the varying phases of Venus and Mercury were, of course, among the first points of telescopic vision—and a glorious insight they gave into the arrangements of our system. Then the actual physiognomy of the moon, the sun, and some of the nearer planets, after which the unaided eye could only vainly strain itself, and desire for more help, opened fresh fields of inquiry. More lately, the indefatigable study of the fixed stars and nebulae—with the aid of powerful instruments, and especially by the two Herschels—has enlarged so prodigiously the boundaries of our knowledge and of rational and interesting speculation, that it is impossible to overrate the charms of this branch of practical astronomy. It has, however, been so fully considered in a recent article* on Sir John Herschel's "Observations of the Cape of Good Hope," that we gladly abstain from further notice of it at present; desiring to concentrate the reader's attention on the department of practical astronomy cultivated alike by the ancients and moderns before and since the invention of the telescope, and which consists in the *measurement of space* with reference to the places of the heavenly bodies, and the comparison of those places with theory.

Whoever would record the positions of the heavenly bodies at any moment, and compare them (as regards their apparent movements relatively to one another) at some future time, must do so by referring them to certain lines or directions, which may be regarded as fixed and known.

The easiest reference is found by a comparison with that which is familiarly used to determine the position of places on the sur-

face of the earth, or latitude and longitude. Though the terrestrial and celestial globes are not only different in their delineations (as a certain lady of fashion is said to have discovered, when she returned her globes to the maker because they were not a *pair*), but also in their *idea* or principle, the apparent place of a star on the celestial sphere may be defined by two angles, called declination and right ascension, corresponding accurately to those of latitude and longitude, which determine the spot on the surface of the earth occupied (for example) by New York or Mont Blanc. Whirl a globe round its axis, and a pencil approached to the surface will touch all places having the same latitude—all stars having the same declination. Stretch a thread tightly from pole to pole, and it will meet the position of all places on the surface having a common longitude, and (on the celestial globe) of all stars having the same right ascension. The pencil mark will meet the thread but in one point; thus the place is fixed completely by two angles, measured each from the centre of the globe along those circles; the *zero point* of reference for right ascension being determined by a particular point called the Vernal Equinox, or the first point of Aries: Whilst on the terrestrial globe the longitudes are measured from the meridian of Greenwich.

If we imagine the eye placed in the centre of a celestial globe, and the fictitious stars to be each pierced with holes through its surface, that eye would, if the globe were properly turned, see each star in the heavens through its appropriate hole. Such, in fact, is all the information which a celestial globe is intended to convey—the idea of direction, or apparent place—not at all that of distance. The moving lights of heaven—sun and moon, planets and comets—change, from day to day and from hour to hour, their seeming place. To be able to define accurately their apparent place at a given instant, is the first aim of the practical astronomer. This is done by ascertaining their declinations and right ascensions—the former being the apparent angular distance of a star from the celestial equator; the latter, the angle formed by the meridian (or line traced by the thread stretched from pole to pole and touching its place) with some other meridian, drawn arbitrarily or otherwise among the stars; just as in geography we, in Britain, refer the longitude of places to that of Greenwich. The astronomer, having traced the motions of an erratic star or planet

* Ed. Rev. vol. lxxxviii.

on the apparent surface of the sphere, possesses the data for testing the truth of astronomical theories, whether of merely *formal* theories like those of epicycles and deferents (as they were called), or of *physical* theories like those of vortices and of gravitation. The apparent complication of these movements is in nature exceedingly great: consequently, the coincidence of *observed* with *predicted* places is the best test of theories; and thus the perfection of our observations becomes essential for the establishment of theories, especially of that greatest of physical laws hitherto detected by man—the law of gravitation.

But the power of tracing with accuracy the places of the heavenly bodies on the apparent vault of the sky, and therefore with reference to one another, carries us a step further, even to the measurement of the impassable and seemingly illimitable spaces which divide them from us. We cannot, indeed, apply a rod or chain to measure the moon's distance, but we may do as those surveyors did who measured the height of Mont Blanc ere it had been ascended. Our earth, to be sure, is very small, compared with the spaces which separate from us even the nearest of the heavenly bodies, and a mere mathematical point as compared to the distances of the fixed stars. It is, however, so large that the moon, for instance, is very visibly displaced as we regard her from one part of the earth or another. The direction of the earth's axis is a perfectly well-ascertained line. If we look in its direction from any part of the earth's surface, the whole firmament appears to revolve round it by the diurnal movement; in this direction, then, a telescope may be accurately pointed. Let this telescope next be turned on the moon: the angle which the telescope describes may be called the moon's north (or south) polar distance. If this experiment were performed *simultaneously* at Greenwich and at the Cape of Good Hope, the moon would appear further *north* from the latter than from the former station; for the same reason that if we go from the lower to the upper window of a house, the neighboring chimney, which in the former case seemed to touch the distant weathercock, now falls far beneath it. Thus also the moon, when she passes centrally over a fixed star, as viewed by a spectator near the equator, will leave it unclipped to an astronomer in the Arctic or Antarctic Seas, passing to the south of it in the one case, and to the north in the other. This seeming displacement is called *paral-*

lax. The greatest amount of parallax which the moon could possibly have, would be, if we imagine a spectator placed at either pole of the earth. The displacement to each, compared to the moon's position as seen from the earth's centre, would be about a degree, or the whole angle under which the earth's diameter (8000 miles) is seen at the moon, is two degrees.

In the same manner the parallax of the planet Mars and the planet Venus, when nearest the earth—and even the distance of the sun—may be ascertained by observations made, *under favorable circumstances*, at different parts of the earth's surface; and since we are personally confined, by a physical necessity, to the surface of our globe, we can only make the best of the limits of voluntary excursion which Nature and Providence have assigned to us.

But though our voluntary peregrinations be confined to narrow limits—although our globe is but a speck in space, and although a voyage from pole to pole would be, by the shortest route, but some paltry 12,000 miles,—fortunately for astronomy, we make an annual tour in the course of our orbital revolution round the sun, which carries us to two points of space nearly 200 millions of English miles apart. Seated on this comfortable railway carriage called the globe, we are actually tearing through space at the rate of nineteen miles *per second*, or 67,000 miles an hour; and the distance and position of the sun being known at any time by observation, the actual distance between the points of space occupied by us, the traveling spectators, on any two days, is accurately known. For instance, on the longest and on the shortest day, our positions are, as we have said, nearly 200,000,000 miles apart. Of course this annual trip makes a vast change in the celestial scenery of the bodies nearest to us. The other planets, if they did not move themselves, would appear to do so by our own relative motion;—as it is, they have apparent movements, resulting from *their own*, as well as from our earth's orbital motions. But the most extraordinary fact is this: that, notwithstanding the vast space which separates the position of our earth at opposite seasons of the year, the scenery of the fixed stars is noways sensibly distorted by our change of place. The vast distance from the earth to the sun is seen from the nearest fixed star under an angle probably not exceeding *one second*—which is about *one two-thousandth* of that which the sun's or moon's disc subtends! This is called the

annual parallax; and, admitting it to exist, the nearest fixed star must be 206,000 times more distant from the sun than our earth is; or 5,000,000,000 diameters of our globe, or about *twenty billions* of English miles!

Thus our knowledge of the distance of the fixed stars (the greatest to which the art of mensuration has yet extended) depends upon the diameter of the earth's orbit; which again is deduced from a triangle having the earth's diameter for one of its sides. But how is this last quantity to be determined?

The measurement of the earth was one of the most justly celebrated problems of antiquity. The science of *geometry* owes its name to this single application. We must refer to previous papers in this Journal* for its history and solution. But we may observe that the fertile principle of triangulation is here, again, the basis of operation. At first, extensive though rude measurements of considerable spaces of the earth's surface were attempted. Norwood, about 1635, *guessed* rather than ascertained, the distance from London to York, by measuring with a chain along the highway, allowing for its bends and obliquities, and sometimes merely by pacing. But the ingenious Snell made a better determination, by ascertaining a comparatively short distance by means of *exact* measurement,† and extending that measure, by a series of connected triangles, to a comparatively large portion of the meridian,—a process improved, in later times, by measuring a *second* base line near the close of the operation, and comparing it with the result of calculation carried forward through the whole intermediate network of triangles. A coincidence of the calculated and observed results gives the very highest probability to the accuracy of the whole operation. From such an extended arc of the meridian the dimension of the whole globe is inferred, by reasoning which we cannot stop here to explain, but which in the simple case of the earth, being supposed truly spherical, is exceedingly easy and direct.

Now on these processes we have two remarks to make. *First*, that the operations of practical astronomy, as far as they regard the fixation of the distances and positions of the heavenly bodies, depend upon one single fundamental measurement of space, just as

in surveying land with a Theodolite;—that measurement being the single measured side of the network of triangles which (rigorously speaking) is all that is required to measure an arc of the meridian, and consequently the axial diameter of our globe. Any error in that single fundamental linear measure is *proportionally transmitted* through all the succeeding calculations. The rod used in measuring a base line is commonly somewhere about ten feet long: And the astronomer may be said truly to apply that *very rod* to mete the distance of the stars! An error in placing a fine dot which fixes the length of the rod, amounting to *one five-thousandth* of an inch (the thickness of a single silken fibre), will amount to an error of 70 feet on the earth's diameter, of 316 miles on the sun's distance, and to 65,200,000 miles on that of the nearest fixed star! The *second* point to which we would advert is, that as the astronomer in his observatory has nothing further to do with ascertaining *lengths* as distances (except by calculation), his whole skill and artifice are exhausted in the measurement of *angles*; for it is by these alone that spaces inaccessible can be compared. *Happily, a ray of light is straight*; were it not so (in celestial spaces at least), there was an end of our astronomy. If we may be permitted a pleasantry on such a subject, it is our *beam* compass, and it is inflexible as adamant—which our instruments for ascertaining its position unfortunately are not. Now an angle of a *second* (3600 to a degree) is a subtle thing. It is an apparent breadth utterly invisible to the unassisted eye, unless accompanied with so intense a splendor (as in the case of the fixed stars) as actually to raise by its effect on the nerve of sight a spurious image having a sensible breadth. A silk-worm's fibre, such as we have mentioned above, subtends an angle of a second, at $3\frac{1}{2}$ feet distance; a cricket ball $2\frac{1}{2}$ inches diameter must be removed, in order to subtend a second, to 43,000 feet, or about 8 miles,—where it would be utterly invisible to the sharpest sight, aided even by a telescope of some power. Yet it is on the measure of one single second that the ascertainment of a sensible parallax in any fixed star depends; and an error of $\frac{1}{100}$ of that amount (a quantity still unmeasurable by the most perfect of our instruments) would place the star too far or too near by 200,000,000,000 miles, a space which light requires 118 days to travel.

The practical astronomer is not, however,

* Ed. Rev. vol. v.; vol. ix.; vol. lxxxvii.

† *Eratosthenes Batavus*, 1617. The measured base on which Snell ultimately depended was only 87 perches (of 12 Rhineland feet each), or about 1080 English feet. (Delambre, "Hist. d'Astron Moderne," ii. 97.)

constantly or principally employed in directly measuring the distances of the heavenly bodies, or the dimensions of the earth. The earth's diameter is now known with very great exactness, and the distance of the sun cannot become much better known, at least until the recurrence of the rare phenomenon called the transit of Venus. But the astronomer is engaged in ascertaining from time to time, with the utmost accuracy, the positions of the so-called *fixed* stars (which have *all*, however, without exception, some small apparent motions), because these are the true landmarks of the heavens, to which the positions of all other bodies, sun, moon, and planets, are constantly referred;—and likewise in comparing the positions of those moving bodies, from time to time, with tables, constructed from the best existing theories of their motions, in order that such theories may be improved. The great usefulness of such improved theories will be seen in the course of the following pages.

II. We now proceed to give a general idea of the instruments used for ascertaining the position of a heavenly body in the sky, by means of the angles of Right Ascension and Declination, of which we have already spoken.

The ancients reckoned the right ascension of the heavenly bodies from that of a certain bright star in the constellation called *Aries*, which star nearly coincided with the position of the sun at the equinox of spring. There is at present no star in that place; yet astronomers know how to find the equinoctial points (as they are called) in the sky, and to reckon right ascensions from them, just as we count longitudes on the earth's surface from the meridian of Greenwich.

Imagine a straight and perfectly vertical wall built truly north and south, or in a plane coinciding with the earth's axis. A spectator looking carefully along one side of such a wall would observe at the same instant all celestial bodies, having the same right ascension, to pass out of sight behind the edge of the wall (in consequence of the apparent diurnal motion of the heavens), supposing that he looked along the eastern side; or to start simultaneously into view if he watched them at the western side. Their apparent passage across the plane of the wall may be called their *transit across the meridian*. Each successive hour, nay, almost every minute, will bring some new object to the same position of passing the meridian; and since the diurnal motion of

the stars is *absolutely* uniform, the intervals of their passages, measured by a good clock, will give a proportional measure of the angles between the meridians belonging to each object respectively. In fact, whether the clock go true or not, provided only that it go *regularly*, we have but to observe the interval of time between the passage of a star across the meridian and its return to it again; and considering that in that time the heavens must have made an entire revolution of 360° , we may by the rule of three find the angle corresponding to the intermediate place of any star whose time of transit by the clock has been noted. The entire period of revolution of the heavens from a star passing the meridian to its return, is called a *sidereal day*; one twenty-fourth of this is a sidereal hour, and so forth.

Now, if instead of merely *looking along* the side of a wall—an operation whose accuracy is comparable to that of observing the sun's shadow formed by the *style* of a common dial, and which is evidently the same in principle—we use a telescope with cross wires in its focus, and which is compelled to move always against this wall, we have a better kind of observation. If this telescope further carry with it an index which points to the angles of elevation, to which it is pointed at the instant that the star passes the meridian, the angles being drawn or engraved upon an arc of the quadrant, measuring degrees with the vertical, we ascertain the two determining angles or *co-ordinates* at the same moment; that measured by the time of the meridian passage or transit giving the *Right Ascension*, and the angle with the vertical (to which, when a certain angle is added, we have the angle with the direction of the earth's axis) giving the *North Polar Distance*. This method was due to Römer, or possibly to Römer and Picard jointly, and was practiced by Flamsteed for thirty years, from 1689 till his death.

A method in some respects preferable consists in using two separate instruments for these determinations. At all events, a good Transit Instrument (as it is called) cannot be made without allowing the telescope, which is to move strictly in the plane of the meridian, to be secured to a horizontal axis firmly sustained at both ends; and when this is done, *the meridian wall which we have supposed may be entirely dispensed with*. The transit instrument, the simplest and most effective of all astronomical apparatus, was the invention of Römer, an eminent

Danish astronomer, about the year 1690.* It was introduced at Greenwich by Halley, the second astronomer royal, in 1721, but was evidently but little known in England some years later, being described by the visitors of the Royal Observatory, in 1726, as "a curious telescopic instrument."† Dr. Pound had, however, used one previously, which was probably the earliest in England. Halley's instrument is still preserved at Greenwich—5 feet long, $1\frac{3}{4}$ inches aperture. The telescope is not attached at the middle point of the axis, an arrangement not easily to be accounted for. The transit instrument has three adjustments for placing it correctly in the meridian; but for an account of these we must refer to more special treatises. In modern instruments five or seven vertical and equidistant wires are placed in the field of view, so that the apparent passage of the star across all may be noted, and the average taken.

The Clock, one of the greatest of modern inventions, is the invariable and most essential companion of the transit instrument. The invention of the pendulum clock is somewhat obscure; but in the hands of Huygens and Hooke it first became practical, and this was only about the year 1657, or eighteen years before the foundation of Greenwich Observatory (August 10, 1675). The earliest English pendulum clocks (after those of Hooke) were probably by Tompion. Flamsteed had two—with pendulums thirteen feet long (beating two seconds), and they were wound up but once a year. He did not regard an error of ten seconds in the determination of time as excessive;‡ and when his clocks were out of order they would err as much as eleven minutes per day.§ In Halley's time they were not much better. They had no provision for going during the time of winding; and the bob often struck the sides of the case, and thus altered the rate! A *journeyman clock*, to take seconds from the principal clock, having a loud beat, and probably striking a bell at the full minute, appears to have been used

by Römer. But Graham, one of the most eminent of British artists, subsequently brought his timekeepers almost to a level, in point of performance, with those of the most recent times, as the clock rates in Bradley's time (1750) clearly show.*

For measuring altitudes (and hence polar distances) a divided brass arch of ninety degrees (or a quarter of a circle) has been in almost immemorial use. But though it may appear sufficient in theory for measuring all angles between the horizon and zenith, it is found to be practically much better to employ complete circles, divided from 0° to 360° ; whereby many errors arising from the imperfect division, the inaccurate centring, the flexure and the deterioration by use, of the instrument, are avoided. Circular instruments are most commonly confined to the meridian, the circle itself (like a wheel with spokes) turning along with the telescope, and its position being ascertained by six equidistant microscopes, used for noting the divisions engraved on the circle; they are fixed to the solid wall or pier, with which the circle is connected by a horizontal axis passing through the pier.

The *zenith sector*, as usually constructed, is merely a telescope of considerable length connected with an arc to which the movement of the telescope, carrying cross wires, may be referred for measuring the zenith distances of stars when that angle does not surpass a few degrees. Such a construction admits of the use of very long telescopes and proportionally large divisions on the *limb* or arch, which, being exceedingly short, is not thereby rendered unwieldy. It was by the use of such an instrument that Bradley made his celebrated discoveries of aberration and mutation. It is likewise an effective instrument for taking latitudes in trigonometrical surveys.

Altitude and azimuth circles are those which admit, by their construction, of taking elevations or zenith distances, not only in the meridian, but in any other vertical plane, whose inclination with the meridian or azimuth they likewise determine. They have advantages especially as portable instruments, and where a consecutive series of observations in one spot, and for a lengthened time, is intended: they have likewise the important advantage of *reversion*, or the capacity of being used on the meridian with the face alternately east and west. But, on

* Horrebowii Opera, iii. 48.

† "Rigaud's Life of Bradley," p. lxxii. "A learned friend has remarked to us that 'curious,' in the scientific language of the day, meant 'accurate and delicate,' which is no doubt true. But we are entitled to infer that had the transit instrument been familiarly known at that time it would have been referred to by its own name. It was described as 'curious,' because it was really more accurate than the instruments then in common use.

‡ Baily's Flamsteed, p. 45.

§ Ib. p. 114.

* See "Bessel Fundam. Astron," p. 91. Bradley's clock was made by Skelton, Graham's pupil.

the whole, such instruments have been little employed in fixed observatories; partly from the difficulties of construction when the dimensions are very great, and partly from the labor of calculation indispensable for deducing the true place of a heavenly body from such observations. There have, however, been three great exceptions, in which excellent work has been done with the altitude and azimuth circle;—the five-foot circle at Palermo, made by Ramsden, and used by Piazzini for his catalogue of the stars; the eight-foot circle at Dublin (planned by the same maker), employed by Brinkley in ascertaining the small apparent motions of the fixed stars; and the recently-constructed altitude and azimuth circle used by Mr. Airy, at Greenwich, for observing the moon, as we shall presently mention.

The various instruments we have now described all require peculiar *adjustments* before they can be applied to any useful purpose. The transit instrument, and the circle or zenith sector, must be capable, for instance, of being placed accurately in the meridian, and the telescope accurately adjusted to the zenith point, before right ascensions, can be obtained by means of the one, or polar distances by the other. The limits and popular nature of this article forbid any attempt to enter into these important *minutiae*; but the reader may find them very plainly and clearly expounded in Sir John Herschel's excellent elementary treatises on astronomy.* We will only remark here, that the verification of the transit instrument is the more easy and simple; the determination of zenith points less direct, especially in instruments like the mural circle, which are incapable of being turned round so that the face of the instrument may be either *east* or *west* whilst the telescope is directed to an object on the meridian. But circles fixed to walls cannot be so used;† and the zenith and horizontal

points are then very ingeniously determined, by observing a star alternately by direct vision through the telescope, and then as its image appears reflected from a basin of quicksilver. By a simple optical law the position of the telescope, exactly intermediate between the two observations, is the horizontal position.

But the north polar distance of a body may be inferred independently of a knowledge of the zenith point. The instrument called the Equatoreal telescope is arranged with this view. This telescope is attached to a firm axis or shaft parallel to the earth's axis,—so that, as it revolves, the telescope follows the natural diurnal course of the stars. The *polar axis*, as it is called, is now generally connected with a piece of clock-work (of a peculiar construction, somewhat resembling that of a common *jack*, and without a pendulum; so that the motion takes place without jerks or starts of any kind*), which causes the telescope to follow, spontaneously as it were, the motion of the object, and thus keep it always in the field. The right ascension is shown by an index connected with the polar axis, and pointing to an hour circle; the north polar distance by an index connected with the telescope itself. Owing to the inevitable tendency to flexure of the oblique-lying polar axis, and the intricacy of the adjustments, the equatoreal construction is never used for determining with *extreme* accuracy the places of celestial objects; but it is still most useful,—*first*, for ascertaining the places of comets and other erratic bodies which cannot always be seen on the meridian (and by comparing their transits across the wires of the telescope, in *any* fixed position, with that of known stars, their places may be very accurately estimated); and, *secondly*, for mounting powerful but unwieldy telescopes, when the divided circles become the readiest means of pointing such telescopes to given objects. The largest refractor in the world—that at Pulkowa, near St. Petersburg, made by Merz and Mähler, 14·93 inches aperture—

* Some excellent practical information in a popular form may also be obtained from Captain Smyth's "Celestial Cycle."

† Bradley determined his zenith point by shifting his sector bodily from an east to a west wall; and this method was practiced at Greenwich down to the time of Maskelyne; and the result was used for finding the index error of the quadrants. Bradley's skill is shown by the accuracy of his determination of the latitude of Greenwich when compared with the most recent results:—

	Latitude Greenwich.
Bradley, from his annual observations	51° 28' 39½"
Bessel, from Bradley's obs.	- - 51 28 39·6
Maskelyne ("Requisite Tables,"	
1802, p. 199,)	51 28 40·0

Pond	- - - 51 28 39·0
Airy, from 5862 obs.	- - - 51 28 38·2

Flamsteed, in 1676, made it 51° 25' 10" by his sextant; but in 1690, 51° 28' 34" by the mural arc. (Baily, p. 346.)

* The Equatoreal at Liverpool is moved by *water power*, the velocity being uniformly maintained by Sieman's ingenious regulator. In the more usual construction of equatoreal clocks, the friction of balls replaces the retarding action of the air's resistance in the common jack.

is thus mounted; so are the great refractor of the Washington National Observatory, U. S., and the Northumberland Telescope at Cambridge. Mr. Lassell, of Liverpool, has been successful in mounting a ponderous reflecting telescope, of two feet aperture, in the same way.*

III. Such, very briefly, are the principal instrumental means of making astronomical observations. We shall now say something of observatories and their arrangement: taking the National Observatory of Greenwich as our chief example, because one of the most extensive and most systematic in the world, the most important in its *past* results to astronomical science, and because naturally the most interesting to our readers.

Observatories were originally little less than what their Latin name (*specula*) imports,—look-out towers raised above surrounding objects and low vapors. Galileo showed the satellites of Jupiter from the lofty campanile at Venice; and all the early observatories were built somewhat on the same plan. That of Copenhagen, for instance (founded in 1632), was 115 Danish feet in height, and 48 feet in diameter; a stair, or rather a spiral passage, led to the top, so that, as at Venice, it could be mounted on horseback, which the Czar Peter really did, and the empress Catherine in a six-horse coach! But far graver inconveniences than trees or fogs attended these lofty towers. The Danish astronomer, Römer, was so persecuted by the wind that he was glad to shelter his really useful instruments in his own house, where his principal observations were made. Finally, the Observatory having taken fire, the whole of the valuable manuscripts were destroyed in consequence of the inaccessibility of the building.

Römer was, perhaps, the most original and ingenious astronomer of his day. He was the discoverer of the progressive motion of light, and the undoubted inventor of the transit instrument. But, besides this, he designed and executed the first meridian circle with fixed microscopes, on a plan which appears almost unexceptionable, and which anticipated the ultimate progress of practical astronomy by more than a century. He also placed a transit instrument at right

angles to the meridian, for the purpose of determining declinations as well as right ascensions by the use of the clock—a method, the beauty and value of which are only now beginning to be appreciated. Römer's little "Tusculan," or rural observatory, as described by his pupil Horrebow,* is admirably contrived, with little show; and it was here that he made that three days' course of observations (*Triduum Roemer*) 20–23d Oct. 1706, which, owing to the fire already mentioned, has descended to us as almost the only relic of his observatory work. It consists of determinations of the places of the sun, moon, planets, and eighty-five fixed stars, and is truly, as Delambre has described it,† "a work worthy to serve as a model." The right ascensions were observed with all three wires of the transit instrument—a precaution often neglected even by Bradley fifty years later. The piers of the instrument were blocks of fir wood, the axes were hollow cones of iron. We may here note, that observatories like that of Römer of small pretension, and in by no means favorable situations, have often produced greater results than national establishments, furnished at a lavish expense, but for ostentation rather than use; or, at least, abandoned to the care of indolent or mercenary guardians. Thus Catherine II. ordered for the observatory of St. Petersburg the finest and most expensive instruments which London artists (then the first in the world) could produce; but having done so, and filled the journals with announcements of her liberality and love of science, they were allowed to rust in their cases!‡ On the other hand, small private observatories, like Mr. Lassell's at Liverpool (in one of the worst climates in Britain), and Mr. Bishop's at the Regent's Park, directed by the zeal of Mr. Hind—not to mention Sir William and Sir John Herschel's—have produced some of the most interesting, and, at the same time, most optically difficult modern discoveries. Captain Smyth's Observatory, described in his "Cycle of Celestial Objects," deserves mention as an excellent model for a simple private establishment, and his work as a useful guide to the amateur. "A man may prove a good astronomer," says Captain Smyth, "without possessing a spacious observatory. Thus Kepler was wont to observe on the bridge at Prague: Schoeter studied the

* Flamsteed's sextant was mounted with a polar axis merely for the convenience of directing it to the heavens. (See engraving in "Historia Celestis," vol. iii.) Römer constructed a well-devised equatorial instrument (under that name) in 1690. See Horrebow, *Opera*, iii. 39.

* *Opera*, tom. iii. cap. xvi.

† *Hist. Astron. Moderne*, ii. 655.

‡ Delambre, *Hist. Moderne*, p. 620.

moon, and Harding found a planet, from a *gloriette*; while Olbers discovered two new planets from an attic of his house."

The observatories of Paris, Milan, Bologna, and indeed of Greenwich itself, attest the formerly universal practice of giving to these edifices the form of a lofty tower with a flat roof.

The introduction of *fixed* instruments—that is, of instruments that rest upon piers (like a transit), or are attached to stone walls (like a mural quadrant or circle)—necessitated a very different construction; and the principally effective part of most modern observatories consists of a range of rather low buildings running east and west, so as to contain but one chamber in breadth from north to south. Thus each apartment having a slit in the roof and two walls may command the zenith, and the north and south horizon. Revolving domes containing a slit, for the shelter of equatoreal telescopes, are often raised up to the second floor, the instrument resting upon a very solid pillar of masonry carried up from the ground.

A foundation of sand, clay, or gravel, has usually been preferred to solid rock, which is supposed to convey injurious tremors more readily to the instruments. The Edinburgh Observatory, however, which is built on a rock, through which there now passes at no great distance a railway tunnel, is stated by Professor Smyth to be in no way injured by this seemingly untoward circumstance.

The National Observatory of Russia, at Pulkowa, about twelve English miles from St. Petersburg, is probably the most elaborately complete modern observatory, having been erected, with the usual liberality of the Emperor, at a cost of no less than 2,100,000 paper roubles, or about £80,000 sterling,* and endowed with a revenue of £2,500 a year.

It consists of a great central building, nearly in the form of a cross, composing the observatory proper, with apartments for observation and computation. It is surmounted by a noble dome, which contains the Great Refractor—the triumph of the Munich workshops. The special aim of this Observatory is Sidereal Astronomy. A smaller dome surmounts the east and west arms of the cross. Two extensive wings, containing the habitations and offices of the entire personal establishment, extend the

imposing frontage, which is in the Grecian style, to more than 800 feet. It is the noblest edifice ever yet erected to the purposes of science. The personal establishment, under the able direction of M. Struve, includes fourteen, besides servants and ordinary workmen, and the families of all. The total number of inmates in 1844, was 103.* A most admirable scientific library, collected at a great expense, forms part of the outfit, of which an excellent and useful catalogue is to be found in the description of the observatory mentioned at the head of this article, and to which we must refer for further details, into which, unfortunately, our limits do not allow us to enter. Russia may indeed be justly proud of her Temple to Urania, and of the fame of Struve, her astronomer; yet, when we compare all this splendor with the humbler practical establishment at Greenwich, we feel that there is an amount of mere luxury in buildings, in instruments, in the unstinted supplies of an imperial treasury, which threatens, under a less energetic chief, to seduce men from the full performance of a most toilsome duty. Pulkowa is like the palace of an astronomical autocrat, who has but to *will*, and men and money appear at his call to take the heavens by storm. Greenwich resembles the counting-houses of some of our opulent city merchants, showing more brick than marble, but whose cellars are stored with the accumulated wealth of generations.

The general position of Greenwich Observatory has been already described. The building consists of two very distinct parts; the *Old* Observatory having the usual tower form (in this case octagonal from the first floor), surmounted by a flat roof from which rise two small turrets; and this central tower is flanked by two wings, also of brick, and now capped with two small, revolving domes. This edifice, which is conspicuous in every view of the Observatory, faces the river Thames, coming forward to the very brow of the hill which it occupies. With the exception of the two small domes, it is *nearly* in the state in which it was constructed from Sir Christopher Wren's plan. Contiguous to it, on the south, is the dwelling-house of the Astronomer Royal, which has received several successive additions. The *New* Observatory dates, in its greater part, about a century back, and lies

* This includes £12,000 for the cost of instruments, entirely furnished from Germany.

* "Description de l'Observatoire de Poulkova," p. 54. The fourteen persons mentioned above include secretary, mechanist, pupils, &c.

quite detached, and to the S.W. of the former building. It is comparatively low and unobtrusive. It is chiefly composed of a range of apartments running from west to east. There is a small revolving dome on the second floor near either end. The humble exterior of this, the really working observatory, will probably astonish any person who expects to view a great national edifice celebrated for the quantity and excellence of observations, of the most delicate kind, which have been made in it.

Charles II. founded Greenwich Observatory. It was the natural result of the tendency of the age to render speculative truth practical. Bacon, moved by the pervading spirit, had contributed more than any man to forward and extend the impulse he had himself received; and after the Restoration the physical sciences were in the very zenith of their popularity. Princes and bishops, statesmen and judges, courtiers, ladies, and poets, vied with each other, if not in extending the new philosophy, at least in celebrating its praises, and in attesting their sense of its importance. "Charles himself had a laboratory at Whitehall, and was far more active and attentive there than at the Council Board."* His patronage of the Royal Society (founded 1660, chartered 15th July, 1662) brought him into contact with men of science; and it was owing to an accidental discussion on a proposed method of finding the longitude at sea by lunar distances, that the king became aware of the defective state of astronomy, and the important use to navigation of improved tables of the moon, and (as a first step to them) of accurate plans of the stars. This was early in 1675.† The foundation of the Observatory was laid August 10th, 1675, the site having been suggested and plans given by Sir Christopher Wren: the roof was already covered in at Christmas. Sir Jonas Moore, Surveyor-general of the Ordnance, was particularly active about the matter: he had been connected with the Court as mathematical tutor to James, Duke of York, before the Commonwealth (1647), and had remained loyally attached to the Stuarts during their reverses. On his recommendation Flamsteed was appointed to the charge of the Observatory: his title in the warrant is "our astronomical observator;" and his duty is "to rectify the

tables of the motions of the heavens and the places of the fixed stars, so as to find out the so much desired longitude at sea, for perfecting the art of navigation." The same object is indicated in the inscription, which still stands near the old entrance of the Observatory, to the following effect:—

Carolus II., Rex Optimus,
Astronomiæ et Nauticæ Artis
Patronus Maximus,
Speculam hanc in utriusque commodum,
Fecit.

Anno Dni MDCLXXVI. Regni Sui XXVIII.
Curante Jona Moore milite,
R. T. S. G.*

Flamsteed held his office from 1675 to Dec. 31st, 1719, when he died at the age of 73. Few men have left so conscientious a record of a life of toil. Less skilled in the theory and construction of instruments than Römer, he yielded to no astronomer of his day in his ideas of the precision and diligence required in making, recording, and reducing observations; and his "*Historia Celestis Britannica*" (posthumously published) will remain, to all time, an imperishable monument of the history of the heavens at the commencement of the last age.†

The liberality of the Government extended no further than to building the Observatory and giving the astronomer a salary of £100 a year; which Flamsteed used to say (and truly) he earned by labor "harder than thrashing." But the strangest neglect was, that no instruments were provided for him. He had not only to thrash, but to *find his own corn*. Sir Jonas Moore, his kind patron, did indeed give him some instruments, namely, a large sextant, two clocks, and a telescope: but Government was deaf to his demands for money to construct others which he imperatively required, and which he eventually furnished from his own resources; so that at his death, not one article contained within the bare walls of the Observatory was the property of the Crown,—a circumstance

* These letters (as appears from the "*Historia Celestis*," vol. i. p. 26,) signify *Rei Tormentaræ Supervisor Generali*.

† Flamsteed's "*British Catalogue*" has been reprinted, with elaborate corrections and notes, by Mr. Baily. As a specimen only of its interest and importance to astronomy, we may mention that it contains six observations of Uranus—one in 1690, one in 1712, and four in 1715 (of course mistaken for a fixed star), which have been of great use in the Theory of Neptune. For further particulars of Flamsteed's career, see an article on his life in this journal, vol. lxii.

* Macaulay's "*History of England*," i. 409.

† See Flamsteed's Autobiography in Baily's Life, pp. 37-8; but particularly Flamsteed's letter to Sherbourne, in the same work, p. 125.

which gave a color to the right which he and even some of his successors assumed in the property of the observations which they made. Flamsteed at first had a common laborer assigned to him, at the public expense, to take care of the buildings and act as his servant; and somewhat later he appears to have been allowed a computer or assistant instead. In general, however, he had two regular assistants (who appear to have been engaged or apprenticed for a term of years), and one of whom was paid by himself, as well as spare computers in the country whom he almost constantly employed in the reduction of his observations and in the comparisons of the places of the heavenly bodies with the then existing tables. Most of the computations were made twice by independent persons and compared by himself.

In 1710, in consequence of the complaints of Newton and others as to the impracticability of extracting any information from the Astronomer Royal, the President of the Royal Society, and a selection of its members, were appointed by the Crown a commission of *visitors* to inspect the Observatory, and report its deficiencies to the Board of Ordnance, to purchase Flamsteed's instruments, to instruct the astronomer *as to the observations he should make*, and to cause him to return to them annually a copy of the observations when made.* These summary powers were pretty regularly exercised. But no attempt was made to acquire Flamsteed's instruments for the State. On the whole, the appointment of the board of visitors was authorized by the circumstances of the time; and as in later years their powers have not been tyrannically exercised, the existence of the board has really been of great service to the Observatory, as we shall explain in speaking of its present state.

Flamsteed's really valuable observations commenced in 1689, when he employed his friend Abraham Sharp, at an expense of £120, to construct for him the mural arc, which served to determine both the right ascensions and declinations of the stars of the "*Historia Celestis*," as well as of the sun, moon, and planets.† The divisions of the

limb were estimated or subdivided by counting the revolutions of a screw at first,* and afterward by diagonal divisions. It was $79\frac{1}{2}$ inches radius. An arc of 5" could be distinguished upon it. The Greenwich Observatory has always been known in the neighborhood under the familiar name of *Flamsteed House*, which indeed it still retains.

Flamsteed was succeeded in 1720 by Halley, long his keenest foe; who, being then sixty-four years of age, was certainly too old to execute properly the duties of so onerous a station; especially as he succeeded to the Observatory in a totally unfurnished state, and therefore had to wait, to have instruments made, before his observations could commence. In 1721, he procured a transit instrument, as already mentioned, and in 1725 Graham finished an eight feet mural quadrant, the best instrument of the time, with which Halley continued to observe the moon, until 1737, when he became paralytic, and died in 1742 (June 14th). His observations are preserved at Greenwich in the original MS., but have not hitherto contributed much to the progress of science, nor are likely now to do so.† Halley had no regular assistant;‡ a serious disadvantage, since the observations of right ascension and declination were now for the first time made with different instruments, which besides were placed at some distance apart.

Bradley, the greatest British astronomer of the past century, and, like Halley, Savilian Professor at Oxford, succeeded him Feb. 3, 1742. He had already acquired deserved celebrity by his discovery of *aberration*, or the effect of the progressive motion of light combined with the motion of the earth in its orbit, in apparently displacing the fixed stars. This was followed in 1747 by his discovery (also by observation) of the inequality called *nutation*, an irregularity in precession, afterward proved to be occasioned by the attraction of the moon on the elliptical protuberance of the earth's equator producing a small

double observation of Venus on the meridian, is this note: "Observante Serenissimo Petro Muscovizæ Czaro."

* This method, which would seem to belong to a more advanced stage of practical science, was due to Gascoigne, who first applied telescopes to divided instruments, and who constructed the first Micrometer. He died 1644.

† See Baily on Halley's Observations in Astr. Soc. Mem. vol. viii. p. 169; and Rigaud on Halley's instruments in vol. ix. of the same work.

‡ Baily's Flamsteed, p. 362: Rigaud's Life of Bradley, p. li.

* "Baily's Life," pp. 90, 91. The warrant of Anne is dated Dec. 12, 1710. In the Secretary of State's letter to the Board of Ordnance they are required to "have regard to any complaints the said visitors may make of the *misbehavior* of her Majesty's astronomer."

† The Czar, Peter, visited the Observatory twice in 1698. On the 8th of March of that year, after a

conical motion in the position of its axis. In consequence of these two effects of gravity and the motion of light, combined with the long recognized phenomenon of the precession of the Equinoxes, all stars *appear* to describe (as seen from the earth) certain complicated little orbits, whose general period is a year, but which, not returning into one another, produce fantastical and not inelegant looped curves.* So considerable in some cases are these apparent motions that the stars (called *fixed*) require to have their apparent places computed beforehand just as the planets have, before any careful astronomical results can be deduced from observations compared with them. Thus in the "Nautical Almanack" we have the place of *Polaris* calculated for every day, and many other stars for every tenth day of the year. These discoveries of Bradley were principally made by means of a zenith sector† (an instrument already described.) It was $12\frac{1}{2}$ feet radius, and he considered its results true to a quarter of a second. It was constructed for him by Hearn and Graham, in 1727, and used at Wanstead, in Essex, where he resided with his uncle Mr. Pound, known by his skillful use of the monstrous telescopes then in vogue for measuring the diameters of the planets and the elongations of their satellites.‡ Bradley's sector was removed to Greenwich on his appointment, where it was continually used by himself and his successors down to 1812. It is still doing good work at the Cape of Good Hope, and is illustrious from its long service as well as from the extraordinary value of the observations originally made with it. Considering a correct knowledge of the places of the fixed stars (the landmarks of the sky) as the very foundation of accurate astronomy, it is hardly possible to overrate the practical importance of a discovery of the laws which regulate their apparently capricious motions: not to mention the beautiful physical induction of the cause, which afforded a *direct* proof of the motion of the earth in space, as complete

as the annual parallax of the fixed stars which was then so anxiously sought for.

Bradley entered on his duties at Greenwich with the utmost vigor, although he still continued, annually, his lectures at Oxford. In 1743 he and his nephew, John Bradley (who acted as his assistant), made no less than 18,000 observations; on one day (8th August) they took 255 transits,—perhaps an unexampled effort.* The instruments were Halley's, and they required much repair. It was not until 1750 that Bradley was provided with new instruments, excellent of their kind, through the liberality of George II., who granted £1000 for this purpose, whereof £300 was given to Bird for a new quadrant, and £73 13s. 6d. for a transit instrument by the same maker.† Bird made his quadrant every thing which so imperfect an instrument admits of being made. Its accuracy of division could scarcely be improved. It had a double arc—one of 90° , and one with 96 divisions (this number was first selected by Graham for the convenience of continued bisection of the arc of 60° , which was set off by making the chord equal to radius). By the comparison of the two arcs, contained in Bradley's printed observations, the difference rarely exceeds a second; and Mr. Pond admits, that, by his examination of the quadrant in 1811, the errors of division do not appear to be above that minute quantity, and the earlier observations with the instrument were in all respects perfectly good. By long use, however, (sixty-one years), it had become gradually eccentric, and the error from this cause rose to 8" or 10" near the horizontal part of the limb.‡

With so admirable an instrument, and so admirable an observer, the results could not but correspond; and the commencement of true precision in astronomy really dates from 1750. The observations, however, were not printed until long after, § and they were reduced as regards the places of the fixed stars in an admirable manner by Bessel. The reduction of the Lunar and Planetary Obser-

* Some of these are represented graphically in Captain Smyth's *Celestial Cycle*.

† The zenith sector, with a micrometer, appears to have been the invention of Hooke, and was used by him at Gresham College, in 1669, for ascertaining the parallax of the fixed stars. See Rigaud's "Life of Bradley," p. xii.

‡ Bradley himself, in 1722, measured the diameter of Venus with a telescope $212\frac{1}{2}$ feet long! (Rigaud's Life, p. ix.) It should be noticed that the apparent orbit of γ Draconis was roughly made out, with Molyneux's sector at Kew, by Molyneux himself and Bradley, in 1725 and 1726.

* Rigaud, p. liii.

† One of the most admirable instruments in the Observatory was the clock by Shelton. It bore Graham's name, and appears to have cost £39. See Rigaud's "Life of Bradley," p. lxxiv.

‡ "Greenwich Observations for 1812," p. 234. This instrument is now in good preservation at Greenwich. He corrected the collimation by means of his zenith sector, which he removed from Wanstead.

§ By Dr. Hornsby, Savilian Professor at Oxford in 1795.

vations, which are equally excellent and valuable, has only been performed within a few years by Mr. Airy, as will be mentioned in its proper place. Part, at least, of the range of building which constitutes the present working Observatory was of Bradley's time, and dates from the year 1749.

Flamsteed, we have seen, had a salary of only £100 a year, which was farther reduced by official fees. Halley and Bradley had officially no more; but Halley received a personal addition of £100 a year, in consequence of having served as commander in the navy.* Bradley was offered the living of Greenwich, but conscientiously declined it, on account of the absorbing nature of his duties. In 1752, however, he received a pension of £250, which was added to the official salary of his successors by George III. The salary has, very properly, been of late years still further increased.

Bradley's latter efforts were successfully devoted to the improvement of the tables of the moon; and he died July 13, 1762, aged seventy. He was succeeded by his friend Dr. Bliss, the third in succession who united the posts of Astronomer Royal and Savilian Professor at Oxford; but he died in 1762, after holding the office of Astronomer Royal only three years, and without leaving any observations of such importance as to require especial mention.

Dr. Nevil Maskelyne, of Catherine Hall and Trinity College, Cambridge, succeeded Bliss, in 1765. He retained the office for the space of forty-seven years, and died Feb. 9, 1811, at the age of seventy-eight. At the time of his accession, more stringent rules were laid down by the Royal Society (the official visitors) for ensuring the habitual residence of the Astronomer Royal at Greenwich, and the complete devotion of his time to its increasing duties. Down to this period some doubt had even existed as to the right of property in the observations made at the National Observatory. Flamsteed's heirs, we have seen, claimed the papers in which were recorded his life-long labors as their property. Halley, who had always been clamorous for the public right in Flamsteed's observations, when pressed, in his turn, by the Board of Visitors, avowed his intention of keeping possession of his observations of the moon, that he might get the reward for the discovery of the longitude!† Bradley's

observations were likewise retained by his heirs, and a law-suit, raised by the Crown, in 1767, to recover them, was abandoned in 1776. During Maskelyne's long tenure of office, he was entirely devoted to its duties, making himself all the most delicate observations, particularly those of the moon, and rarely quitting the Observatory, except to attend the meetings of the Royal Society. The perfect method and continuity of his observations give to them a great value, especially for the correction of the Lunar Tables, in which respect they are indeed without a parallel. But the regularity of their publication was not their least merit. Four large folio volumes include with perfect method the patient labors of a life (for he had but one assistant). Delambre, in his character of Maskelyne, says, that if through some catastrophe the whole materials of science should be lost except these volumes, they would suffice to reconstruct entirely the edifice of modern astronomy.

Maskelyne was drawn to the study of practical astronomy by the great eclipse of 1748, —which had a similar influence on the mind of Lalande. He was recommended by Bradley for observing the transit of Venus, in 1761, at St. Helena; and, though the primary object of the expedition was lost through cloudy weather, he made other valuable observations, especially for the determination of the longitude, both by lunar distances and by chronometers. With the same view he went afterward (1763) on a voyage to Barbadoes with Harrison's time-keeper: and from 1767 to the time of his death he superintended the publication of the "Nautical Almanack," a work of infinite use to seamen, of which he edited no less than forty-nine volumes. In 1774 he made his memorable observations on the attraction of Mount Schiehallien, in Perthshire, for the determination of the earth's density; a work of great delicacy, which he executed under disadvantageous circumstances with consummate skill and address.* With regard to the instruments employed by him, they were those of Bradley, with improved object glasses; but he had prepared for superseding the quadrants before his death. Troughton's Meridian Circle was ordered by him, although it was first used by his successor in June, 1812. On the whole, Maskelyne left behind him an enviable reputation. From a perfect devotion to the duties of his office, and a most candid and amiable temper, he was with equal justice both respected and

* Caroline, Queen of George II., who visited the Observatory in 1727, obtained for him this advantage.

† His MSS. were ultimately purchased by the Board of Longitude for £100.

* Phil. Trans. for 1775.

liked by his contemporaries abroad as well as at home.

Mr. Pond, the next Astronomer Royal, resided at Greenwich from 1811 to 1835, when he resigned his office through the pressure of bad health, and died the following year. He had a peculiar skill in the theory of instruments, and the correct interpretation and application of the results afforded by them.* Himself the possessor in early life of a small but very perfect circle by Troughton, he published, as an amateur astronomer, determinations of the places of the fixed stars equal, if not superior, to those determined by public observatories; and demonstrated the increasing errors of the Greenwich Quadrant, due to the eccentricity occasioned by friction on its centre. This error is wholly avoided in circular instruments. At Greenwich he first used Troughton's Circle; and afterward added Jones's, and made observations by reflection. He gradually increased the number of assistants from one to six—a most important innovation, rendering Greenwich Observatory capable of far greater efforts than his own infirm health enabled him to undertake, but of which full advantage has been taken by his successor.

The present Astronomer Royal, Mr. Airy, formerly Plumian Professor, and Director of the Observatory at Cambridge, was appointed to Greenwich in 1835, on the resignation of Mr. Pond. Before we proceed to give some account of his labors, which include, of course, the present operations of the Observatory, we will endeavor to give the reader an idea of its present state, or rather, to speak more accurately, its state until a few months ago, before certain alterations of an important kind were commenced, which we will briefly advert to in the sequel.

We have already stated that the Astronomical Observatory consists of two distinct groups of buildings,—the older castellated part, of the time of Flamsteed, and the low range, of Bradley's and Maskelyne's time: we shall commence with the former. It consists of a great centre tower and two wings. The tower in its lower part is occupied by the dwelling apartments of the Astronomer Royal. Its upper portion consists of a noble octagonal hall, with lofty windows, and balconies, intended for the use of large

moveable telescopes and quadrants; but this room is not at all used now for such purposes. A narrow staircase leads from one of its corners to the leads on the top of the Observatory; commanding a very noble view over the whole of London, and a great part of the course of the Thames, and overlooking, of course entirely, Greenwich Hospital and its domes, as well as the town of Greenwich, and the cheerful slopes and deep woody recesses of the Park. Here are disposed several meteorological instruments, which require a free exposure,—particularly Whewell's and Ostler's self-registering anemometers, which record on paper the direction and quantity or force of wind during the twenty-four hours that elapse between each inspection of them.

Here, also, we find a singular mechanism surmounting the eastmost turret of the Old Building; it is a pole, with a weather vane at the top. Below the cross, on the vertical stem, supporting it, slides a black ball about six feet in diameter: it may be raised by a simple mechanism until its upper edge touches the arms of the cross, which prevent it from going higher; but in its ordinary state it remains down at the lower part of the staff. The object of this useful apparatus—called the *Time Ball*—is to give notice to the whole shipping of the Thames and port of London, of the exact time,—by dropping it daily from its highest position on the staff at the precise instant of One o'clock—Greenwich Time. The business of the assistant, who has charge of it, is, by means of a winch in the lower part of the observatory, to hoist up the ball to its highest position touching the cross *five minutes* before One o'clock every day, including Sunday. There is a time-piece compared with the Observatory clocks which stands near the winch, and also a species of trigger, by which the ball is suddenly detached and allowed to fall by its own weight, which is considerable. To prevent the shock of the fall from injuring the apparatus, the ball is connected with a piston eight inches in diameter, slipping in a cylinder containing air, which thus deadens the shock as by a cushion. The duration of the fall is immaterial to the observation. It has lately been proposed to observe the transit of the ball across several horizontal hoops; but the accuracy of the observation at present appears to be quite adequate to the end in view. At the instant of One o'clock the trigger is withdrawn, and the separation of the ball from the cross is visible to all the ships,

* Mr. Airy, in one of his Annual Reports, states that he regards Mr. Pond as the principal improver of modern practical astronomy.—*Report to Visitors*, 1846, p. 9.

which have chronometers on board; and they may thus have their errors ascertained, without the trouble and expense of sending them up to the Observatory, and the more serious drawback of the probable change of rate which the shaking of land carriage is almost sure to occasion. To check the possibility of error on the part of the time-ball assistant, another stationed in the Observatory notes the moment of the fall of the ball, and registers it daily in a book. The error in time does not usually exceed one tenth of a second; and does not amount to three tenths of a second, oftener than once in six weeks.

In the western wing of the Old Observatory there is a dome, under which was formerly an equatoreal telescope. The position being, however, unfavorable, the telescope has been dismantled and sent to the Cape.

Near this was (till lately) the Zenith Tube Room. This instrument is a modification of Bradley's zenith sector, for measuring small zenith distances (especially for the star γ Draconis, which passes within a few minutes (north) of the Zenith of Greenwich), and it was intended, of course, to be an improvement on that celebrated instrument. It consisted of a tube twenty-five feet long, varying in diameter from six to ten inches, and furnished with a five inch object-glass at the upper end. The tube had no motion except round a vertical axis: zenith distances, therefore, were measured not by the motion of the telescope upon an arc, but by the observation with a micrometer of stars passing through the field. It is needless to describe its action more particularly; for all the skill of Pond and Airy, and all the mechanical dexterity of Troughton and Simms, failed to obtain any satisfactory results with this gigantic instrument. The errors of observation constantly amounted to 2" or 3"; exceeding those of the ordinary mural circle, and utterly destructive of any hope of measuring by this instrument the parallax of the fixed stars. This failure is an instructive example of the serious difficulty attending the construction and working of gigantic instruments, and the fallacy of the plausible expectation that *unlimited* accuracy may be obtained by mere enlargement of scale in our apparatus. Among other sources of error (difficult to foresee or avoid), the pertinacity with which spiders infest zenith sectors has been notorious ever since Bradley's time. These little animals, finding the dark, cool, undisturbed tube a desirable lodging, spin their threads there so assiduously as to en-

tangle the motion of the plumb line, upon whose absolute verticality the accuracy of the instrument depends: and it is difficult either to perceive or remove them. The cunning spider, in thus perplexing astronomers, may be thought, perhaps, only to retaliate upon them for equal vexations which they have entailed upon the busy race of cobweb-spinners: since the very instrument in question, and almost every other in the Observatory, is provided with spider lines (technically called *wires*) in the eye-piece, for fixing the position of a star in the field of view of the telescope; and, to provide these, the optician is in the habit of training a certain kind of spider which furnishes the best thread for spinning long lines—to serve his own ends, not theirs, to catch stars, not flies:—*Sic vos non vobis!*

The zenith tube having been found ineffectual, is now dismantled, and the apartment otherwise appropriated. Mr. Airy has, however, devised an altogether new instrument for the same purpose, in which the principle of reflection at a quicksilver surface is to replace the clumsy and inaccurate plumb line; but the particular contrivance we can hardly hope, within our limits, to render intelligible.

In the eastern part of the old building, and near the trigger apparatus of the time ball, is an equatoreal telescope by Ramsden, known as Shuckburgh's Equatoreal. It is not, however, much used, since a larger instrument of the same kind has since been added to the establishment.

We now enter the Observatory Proper, at its west end (which also communicates, by means of a covered passage, with the astronomer's house), and we first find ourselves face to face with that fine old brazen quadrant by Bird, eight feet radius, mounted on a pier so that the telescope points to the southern meridian, and which furnished the admirable declination observations of Bradley and Maskelyne. It is in all respects preserved as when in use, although now of course never employed,—being superseded, since 1812, by the mural circle. On the *west* face of the same stone pier, the east side of which is occupied by Bird's quadrant, is Graham's old iron quadrant; it was made for Halley, but was redivided by Bird for Bradley, who used it for his earlier observations, and also for his later ones north of the zenith. As this instrument is little than a venerable curiosity, the present astronomer has ingeniously managed, without injuring or removing any part of it, to convert the

little room connected with it into a fire-proof room, for the preservation of the valuable MSS. connected with the Observatory: they include a complete set of all the astronomical observations made at Greenwich. Here we have Flamsteed's voluminous MSS., many of them first brought to light and carefully arranged and bound by the indefatigable care of Mr. Baily: and also Halley's rather confused memoranda (never printed) of his tenancy of the place. Of Bradley's observations there is only a MS. copy taken from the originals in the Bodleian, under Mr. Airy's inspection. It may be regretted that the trustees did not think themselves entitled to surrender the MSS. themselves, to which the public have evidently an equitable, if not an undeniable legal, right. Of course Maskelyne's and Pond's MSS. are found here, and there are now carefully preserved the *jotting books* with indelible metallic pencil writing, in which each individual observation is at the time noted by every observer in the establishment. The correspondence of the Astronomers Royal, as far as collected, is also here preserved.

The next room, to the eastward of Bird's Quadrant, is the COMPUTING ROOM,—the grand scene of labor of the whole Observatory. It is only by exception that the astronomer or his assistants are to be found *using* the instruments, even during the regular hours of observatory work; but they are nearly sure to be found assembled in the Computing Room, busied, at different tables, with their silent and laborious tasks,—the assistants on watch turning an eye now and then to a small time-piece which regulates their task of allowing no celestial object of consequence to pass the meridian unobserved. When we come to speak of the personal establishment of the Observatory, we shall try to explain how it is that the calculating work is so much more heavy than that of observation.

Next in order comes the TRANSIT ROOM. The instrument which gives the room its name has been already explained. The Greenwich transit is ten feet in length,—the object-glass by Dollond, the mounting by Troughton: it was set up in 1816. The eye-piece contains seven vertical "wires" (in reality spiders' threads); and the time of passage of each celestial object over every one of these is noted, and the mean taken. The mean or average direction of the whole seven wires determines the ideal line, called the "line of collimation," or optical axis of the telescope. If any of the

wires have been missed by accident, a table is provided, by which the mean result, with those actually observed, may be reduced to the ideal mean. Suspended from the roof, above the instrument, we observe strong braces and pulleys of formidable appearance, recalling the instruments of torture of which traces may still be found in some ancient prisons. An apparatus of question no doubt it is. The telescope, if suspected of wavering by a hair's breadth from the meridian line of truth, is forthwith seized and pinioned by the assistants; and its unwieldy mass having been lifted by main force from its piers, it hangs dangling in the air, until, having been swung horizontally round, it is allowed to seek repose again in its Y's, the ends of the axis having been reversed in position. If the line of sight (or collimation) be correct, the meridian wire will fall on the selfsame spot as before. Should it deviate from the expected place—deviate, though "but in the estimation of a hair"—but a single second, the very brass of the telescope would blush a copper red! We shall say no more here of the verifications of the transit instrument, save that there is a meridian mark at Chingford, on the Essex hills, placed, in 1824, by Mr. Pond. As there is no doubt that it was *absolutely* in the meridian at that time, it may be interesting hereafter to verify the perfect persistance of the direction, on the earth's surface, of the N. and S. line; that is, the constancy of the axis of rotation of our globe.*

Beside the transit stands, of course, a clock. This one is by Hardy, an eminent maker, who died now many years since; and it has been, in part, remodeled. Its performance is quite satisfactory: by which we mean, not that it never goes sensibly wrong, but that its rate (*gaining* or *losing*) is constant, or nearly so, for many days together, so that its error may be at any time allowed for. The most fundamental of all the observations is the knowledge of *time*. Now the mere error of observation with a good transit instrument, when seven wires are observed, is not perhaps $\frac{1}{20}$ of a second of time; hence only the very best de-

* Mr. Pond used this meridian mark with the aid of a collimating telescope on the south of the transit instrument, to ascertain the line of collimation in azimuth without the necessity of reversing the instrument. (See Greenw. Obs. 1532.) As we have spoken above of the *absolute* coincidence of the line of the collimation with the meridian, we should add that the astronomer does not aim at this, but allows, by calculation, for the small deviation which he ascertains.

terminated objects can be employed for determining the clock error. Such are called *clock stars*—the sun himself being never used for this purpose—since the errors of the solar tables (or of the theory of the earth's motion) are still sensible. A consequence from this is, that the astronomical clock does not indicate the time from noon, or the sun's passage. We are surprised to see an observatory clock pointing to eight or twelve o'clock when we know that it is four o'clock by St. Paul's; and still more—going, a few months after, at the same hour—to find that the clock is giving totally different information. We are apt to think that the astronomers are so taken up with dividing a *second*, that they lose count of the *hours*. But the fact is, that the astronomical clock is regulated by the stars, not by the sun, and shows what is called *sidereal time*. Its twelve o'clock, or noon, is when the equinoctial point (in Aries) is on the meridian; and, as a matter of course, the clock at any moment tells what part of the circle of right ascension is on the meridian; and, conversely, by noting the moment of transit of a celestial object, its right ascension becomes known without any calculation. Our civil reckoning is regulated, very reasonably, by the sun, because daylight determines the order of our occupations; but the astronomer knows no such distinction; and the sun is to him merely an object having such and such a right ascension on a particular day, and to be observed in course among the others.

The mode of making a transit observation is as follows:—The assistant in charge of the transit instrument is warned, by his sidereal time-piece approaching the hour which corresponds with the right ascension of the object he is to observe, that he is to prepare for the observation. The shutters of the slits in the roof are probably already open. If the object be the sun, the telescope is protected, by a screen near the object-glass, from the direct rays: for so sensitive is this instrument to unequal temperature of its parts producing a deviation of its axis, that the approach of a man's body to one side or other will twist the line of collimation: hence, transit instruments are often cased in flannel. Having adjusted the telescope to the anticipated altitude of the object in the meridian, by means of a small circle attached to it for this purpose, he seats himself in a very comfortable chair with a reclining back, similar to that in which most of our readers have reclined in a dentist's room. The observing-chair rolls back or

forward at a touch by means of a railway which follows the eye end of the telescope, whilst the observer keeps his head supported by means of the adjustable back aforesaid. When the object is *high*, the observer is *low*: if the object be a star in the zenith, the observer lies almost on his back; and, in this very agreeable posture, he might surely be excused for indulging in a nap! We have not ascertained whether the code of laws of the Observatory contains a punishment for so dreadful an offence. Be this as it may, taking an observation is no sleepy matter; the tremble of impatience for the entrance of the star or planet into the field of view, is like that of the sportsman whose dog has just made a full point, and who awaits the rising of the game. When the star appears, the observer, in technical language, *takes a second from the clock face*; that is, he reads the second with his eye, and counts on, by the ear, the succeeding beats of the clock, naming the seconds mentally. As the star passes each wire of the transit, he marks down in his jotting book, with a metallic pencil, the second, *and the second only*, of the observation, with such a fraction of a second as corresponds, in his judgment, to the interval of time between the passage of the star and the beat of the clock which preceded such passage.* This interval may be estimated either by the judgment of the ear or of the eye. In the latter case, the observer registers in his memory the position of the star relatively to the wire at the preceding and following clock-beat, and subdivides the space mentally.* Before Maskelyne's time, the second was only rudely divided by certain signs of *less* or *more*: but, since 1772, the transits have been noted in decimal fractions of a second; and an experienced observer will never commit an error exceeding $\frac{1}{10}$ of a second on each of the seven wires. The observer then carefully takes the hour and minute from the clock, and adds it to the *last* observation. Stars not very near the sun may be seen and observed with the telescope in broad daylight—an effect of optical power not altogether easy to account for, and deserving of further investigation by experiment. At night, the field of the telescope must be enlightened by a lamp shedding a ray through the transverse axis, so that the spider threads may be distinguished against the brighter ground.

The observations with the transit instru-

* This was Bradley's invention. Rigaud's Life, p. lv.

ment have two distinct purposes: *first*, the determination of *time* from objects whose right ascension is known (clock stars); *secondly*, the determination or correction of right ascension of objects from the true time of passage across the meridian. The clock stars themselves have had their places ascertained in this manner, and cannot be regarded as ever *perfectly* known. When less than four such stars (taken from a list including about sixty principal stars, none of which are less than 50° from the pole, so that their passage across the meridian shall be nearly as rapid as possible) are observed on the same day, their mean result is taken, to give the clock error; but when more than four are observed, the clock error being similarly ascertained, the right ascension of the individual stars thus used is also calculated and entered in the Reduced Observations; because it is concluded that our knowledge of the differences of the right ascensions of these bodies will be perfected by such an observation, and in the long run (being carried from star to star round the heavens) will correct the very individual places whose *collective* accuracy was assumed in the determination of the clock rate—on the knowledge of which the accuracy of those intervals evidently depends. Thus astronomers do really in one sense reason in a circle; but yet have reason on their side—for it is evident, on consideration, that the accumulation of good observations of well-determined stars will tend to annihilate the effect of the error of place of any one or two stars upon the clock-rate, and at the same time bring out the discrepancy in the right ascension of those particular stars.

But we now pass to the CIRCLE ROOM. Here, in 1812, was mounted the masterpiece of Troughton—the six feet mural circle for ascertaining the altitudes of celestial bodies on the meridian, and thence their polar distance. A second similar one by Jones, for observations by reflection, was mounted in 1824; but Mr. Airy having, by a particular method, which he adopted at Cambridge, been enabled to obtain as satisfactory results with one circle as with two, Jones's circle was sent, in 1839, to the Cape, where it still remains. The circle is provided with six equidistant microscopes, fixed to the stone piers in such a manner that, when the circle is turned on its axis, the divisions on it pass rapidly through the field of view of these microscopes, which are also provided with fine spider lines, whose motions are ascertained by counting the revolutions of a screw;

and thus the subdivisions of the spaces on the divided circle are ascertained to great nicety, the mean of the readings of which not only effectually destroy any error of centring (which vitiated the old quadrant observations), but in almost every possible case correct casual errors of division.

It is in contemplation to supersede both the mural circle and transit instrument by a transit circle (now in preparation), with which is connected a telescope of very large dimensions.

Beyond the Circle Room are three apartments devoted to the assistants; and ascending a narrow stair, we find, first, a comfortable and well-appointed LIBRARY of Astronomical and Scientific works, carefully arranged, catalogued, and bound, which are used exclusively by the persons connected with the establishment. The present Astronomer Royal, who has added greatly to the efficiency and completeness of the library, states that it has been found to be most useful in diffusing a taste for science among his subordinates, and in enlarging the circle of their acquirements.* Several hundred pounds have been judiciously applied by the Admiralty to this desirable object.

Adjoining to the library is the CHRONOMETER ROOM. On entering, the visitor is startled by a universal buzz, which sounds almost like the hum of the beehive. It is occasioned by the beats or *ticking* of many rows of chronometers, the property of the Admiralty, or of individual makers who have sent their watches on trial, prizes being occasionally awarded to the most perfect, besides that those found to go most regularly are always purchased for the public service. Two broad shelves on three sides of this room are usually covered with these delicate and valuable machines, whose aggregate worth is never under several thousand pounds. In 1842 there were no less than one hundred and seventy chronometers on trial; at present there are not so many. They are *rated* for the most part daily, and by two persons, to avoid error. The whole process is curious enough. At one o'clock every day the two assistants in charge repair to the room, where is a time-piece set to true time. One person opens the lids of the chronometers (which are almost all in boxes), and winds up each with its own key. His

* Astronomer Royal's Report, 1837, p. 2. Again (1846, p. 3,) he says, "The library is accessible, under simple regulations, to all the assistants, and is producing a marked effect upon their education."

second follows a little after, verifies the fact of each being wound up, and closes the lids. The object of this is to still the din of ticking, which would prevent the clock-beats from being distinctly heard in the comparison. One assistant then takes each watch in succession in his hand, and, reckoning by the eye a second from the clock-face, counts the beats whilst he compares the chronometer by the eye, and in the course of a few moments he calls out the *second* shown by the chronometer when the clock is at 0 second. This number is registered in a book by the other assistant, and so on throughout. They then change places, the second comparing, and the first writing down; but this last precaution is sometimes omitted. The *minutes* are compared with the clock but once a week. From these books of daily comparison are deduced the daily rates by which the goodness of the watch is to be estimated. The errors are chiefly of two classes,—that of general bad workmanship, producing a *lawless* variation in the rate, and that of *over* or *under*-correction for temperature (or *compensation*, as it is called), which may occur even in a watch otherwise perfectly well made. The difference of the greatest and least rate in the course of a twelvemonth, when the watch has been exposed to all the annual changes of temperature, may be ascribed principally to the latter fault; but abrupt changes, shown by comparing one week's mean rate with the next, are considered to be due chiefly to indifferent workmanship. A chronometer is judged of on the whole by a combination of these two tests; yet it is easily seen that such combination is in a great measure arbitrary, and that the selection of a chronometer must depend a good deal on the particular service for which it is to be used. If, for instance, it is to be sent to extreme climates, the perfection of the temperature correction will be most regarded. We must add, that in the middle of the apartment is a stove, and over that stove a large iron tray or pan, which may justly be termed *purgatory*. Here the chronometers, doomed to the highest trials of virtue, do penance for a period in artificial heat, and, when their rates have been taken, are plunged in snow; thus made to

“ ————feel by turns the bitter change
Of fierce extremes—extremes by change more
fierce;
From beds of raging fire to starve in ice
Immovable, infixed, and frozen round
Periods of time; thence hurried back to fire.”

The great care and attention which all chronometers sent on trial to the Royal Observatory invariably receive, as well as the perfect impartiality and authenticity of the reports on their performance, afford great encouragement to this branch of national manufacture—one of vast importance to the safety, convenience, and perfection of navigation. But, notwithstanding the astonishing rapidity with which, by long practice, the comparisons are made, the detail of the chronometer department of the Observatory is a very heavy one, and, in fact, occupies no inconsiderable fraction of the strength of the establishment.* The service thus conferred on navigation is too direct, and is too closely connected with the primary objects of the Observatory, to be given grudgingly; it must be, however, recollected, that so much power is withdrawn from strictly scientific work, and that no part of the chronometer work appears in the “Greenwich Observations.”

Near the chronometer room is the SOUTH-EAST DOME, occupied by a fine equatorially mounted telescope. The object-glass was munificently presented to the Observatory by Mr. Sheepshanks; it is $6\frac{3}{4}$ inches in diameter. This instrument is valuable for ascertaining approximately the places of comets, &c., out of the meridian; and, being fitted with a double-image micrometer, contrived by Mr. Airy (described in “Greenwich Observations,” 1846, p. lxxxvii.), can be used for ascertaining the distances of double stars, the diameter of planets, &c. But these observations are only occasional, not systematic, in this Observatory.

There is another dome connected with these buildings, which is entered by a small stair close to Bird's Quadrant (see p. 172), but which we have hitherto purposely abstained from mentioning, in consideration of its being occupied by an instrument expressly intended to be supplementary to those already described. This is the ALTITUDE AND AZIMUTH, or south-western DOME; it is on the second floor of the “advanced building,” formerly spoken of as the site of Flamsteed's Mural Arc. We have alluded to the inconveniences attending the use of

* In 1842, Mr. Airy stated that the chronometer work occupied the greater part of the time of three assistants. We must, in strict accuracy, add that it is not *usual* to expose the chronometers to the action of frigorific mixtures; but they are sometimes employed when the makers desire it. See *Parliamentary Return on Admiralty Chronometers*, 28th July, 1849.

altitude and azimuth instruments, such as those of Palermo and Dublin. But Mr. Airy considered the special advantage to be derived from observing the moon in parts of her orbit when, on account of the sun's proximity, she is invisible in meridional instruments, to be worth the trouble and expense of constructing a circle with extraordinary precautions for stability, and of undertaking calculations, of great length and intricacy, for deducing the moon's place at such times. The extraordinary pains with which for more than one hundred and seventy years the moon's motions have been followed at Greenwich, and the happy result, in the improvement of the Lunar Tables, as well for the use of navigators as for a test of the theories of physical astronomy, have given to the British National Observatory an undisputed pre-eminence in this department. As the greater part of the lunar irregularities depend in some way or other upon her position in regard to the sun; and as the moon scarcely ever can be observed on the meridian when her time of passage is within four hours on either side of the sun, it is easy to see that nearly one-third of her orbit (relatively to the sun) is unobserved and untested. It was to supply this defect that Mr. Airy recommended and effected the erection of this instrument, which is of singular solidity, with horizontal and vertical circles three feet in diameter. By a comparison of the moon's place with that of well-ascertained stars, *in any part of her diurnal course*, observations may be made in the early morning, or in the evening, when the moon is a slender crescent, and the sun below or only a little above the horizon. Besides this, observations of the moon's place may at all times be obtained when the weather permits, although it may have been cloudy at the instant of her passing the meridian. The observation is made by the method of comparative transit of the moon and a fixed star, both across six vertical wires for azimuth (the horizontal circle being fixed), and six horizontal wires for altitude. The results are satisfactory in quality, being little inferior to those with meridional instruments; and they have increased the number of lunar places ascertained during the year by 75 per cent., and include observations of the moon even within *one hour* of the sun. It may be thought to be a great sacrifice of time and labor (absorbing the strength of one assistant at least) for a single object, the cost being at first £700 or £800, and £150 per annum after-

ward. But on this subject Mr. Airy gives us the curious information that the lunar observations, as previously conducted, might be considered to cost the country £1000 a year, or *each single complete determination of the moon's place to be worth £10.**

This completes our survey of the Astronomical Observatory. We have only space to glance for a moment at a subordinate department, which some of our readers will perhaps consider the more interesting of the two,—the MAGNETICAL AND METEOROLOGICAL OBSERVATORY. We regret that it is impossible for us here to do more than meagre justice to this subject.

A knowledge of terrestrial magnetism has always been most intimately connected with that of navigation, and in some measure, also, with astronomy,—meteorology little less so. The diurnal variation of the needle—the most important discovery next to its polarity and variation—was ascertained by Graham, the clock and quadrant maker of the Greenwich Observatory in the time of Halley. Bradley made observations of the same kind; and so, occasionally, did Maskelyne and Pond. About fifteen years ago, however, a grand revolution was made in the science of terrestrial magnetism, chiefly by M. Gauss, a celebrated German mathematician and astronomer, who had the rare merit at once of inventing instruments capable of ascertaining variations in the force and direction of the earth's magnetical attraction, with a precision resembling the results of astronomy; and likewise of showing how these results, obtained simultaneously over a large part of the earth's surface, might be combined and connected, by mathematical formulæ, in such a manner as to represent, in an accurate and continuous manner, all the phenomena of magnetism at any point of the globe which might be selected, and so to register their changes from age to age.

Although Britain had not the honor of starting first in the magnetic race, yet she very speedily and honorably vindicated the position which her national consequence and widely-spread colonial territories strongly pointed out for her. Of course a *home* observatory—as complete, at least, as those equipped for Canada, St. Helena, the Cape of Good Hope, the East Indies, and Van Dieman's Land—was to be provided; and Mr. Airy at once volunteered to render Greenwich Observatory as effective in the

* Airy, Report, 1844, p. 5.

magnetical as it has always been in the astronomical department. In 1838 a magnetic house or observatory had already been erected within a considerable enlargement to the southward of the old enclosure. After the usual number of official difficulties and delays, this appropriation on behalf of science was sanctioned by the Commissioners of Woods and Forests and the Ranger of the Park. It would be fortunate, if all encroachments on the pleasure-grounds of the public could be so well accounted for. The edifice is of wood, in the form of a cross with equal arms, the general directions being *magnetic* N. and S., and *magnetic* E. and W. It required only additional instruments (for occasional observations had been regularly made from 1838 until 1840, the period of which we now speak), and proper assistance, to make the Magnetic Observatory all that could be desired. Besides magnetic bars variously suspended, a complete system of barometers, thermometers, wind and rain measurers, hygrometers, actinometers, electrometers, and all other *ometers*, were gradually but efficiently provided; and last, not least, a sufficient staff of observing assistants was attached to the already considerable establishment of the Observatory. Their duty, indeed, was not light,—more irksome even than that of the practical astronomer; for here the observations must be made, be the weather what it may, every two hours, day and night, from year's end to year's end, with the sole exception of the twenty-four hours of Sundays. These observations were of a kind which was then new and nearly untried; the instruments had to be proved and adjusted in a thousand different ways before any thing like the same confidence could be had in their use which for generations had attended the operations of astronomy. The calculations and reductions to be gone through were so extensive, that, in consequence and for a series of years, Greenwich Observatory has given to the world two thick quarto volumes of results instead of one,—doubling, at least, the labors of the Astronomer Royal himself, although he generously neither required nor accepted any addition to his official income on the occasion.

The cross-like building, then, contains three principal instruments, or suspended magnets, disposed so as to influence as little as possible one another's motions. We have first a horizontal bar, suspended by a long bundle of silk fibres, which shows the change of direction of the magnetic north (declina-

tion or variation) at any moment. We have, in the second place, a magnetic bar, twisted—by means of the lines which suspend it—away from the magnetic meridian, so that it hangs nearly E. and W.; but, as the magnetic force of the earth increases or diminishes a little from time to time, the north end is a little more pulled to the north, or a little relaxed,—so that the *horizontal force* of the earth's magnetism is measured by the arc described by the needle thus balanced between the opposing forces of torsion and attraction. Thirdly, we have the instrument for measuring the vertical magnetic force, which resembles the beam of a pair of nicely-poised scales,—itself magnetized,—but without any scales attached. The northern end of the beam tends to dip more when the attractive action of the earth, by any cause, increases: on the contrary, when it diminishes, the counterpoise on the S. end of the bar tends to make it rise.

Each of these instruments is furnished with a small, flat mirror (or something equivalent) which turns as they turn. But every one knows that if we turn a looking-glass slowly round with the hand, fixed objects reflected in it appear to wheel about with a redoubled velocity. Gauss availed himself of this principle to watch the *seeming* displacement of a finely-divided scale of inches, viewed, by means of a telescope, as reflected from these moving mirrors; and thus, by an easy calculation, to infer the angular motion of the magnetic bars to which they were attached. The magnetic observers were then required to register, every two hours, the division of the respective scales which they saw reflected in the mirror of each instrument; and these *readings* were at leisure converted into measures of the changes which it was wished to record; namely, of the declination or variation, in minutes and seconds of a degree, and of the horizontal and vertical components of the earth's magnetism, in thousandths of the whole force.

These important and vastly numerous determinations having been corrected, as far as possible, for the index errors of the instruments, and for the effects of temperature on the magnetic force of the bars, have been regularly printed in the supplementary volume of the Greenwich Observations. But as it became evident that something like a perpetual registration of magnetic instruments must henceforth form part of the work of a National Observatory, the attention of scientific men has for some time been directed to the possibility of causing the instruments to re-

cord their indications in the absence of the observers, and thus save a vast amount of severe human labor and vigilance. Government was induced to offer a reward of £500 for such a perfected system; and Mr. Brooke, a medical gentleman of London, has been fortunate enough to adapt the principle of *photography* to it with such success as to be fairly entitled to the reward. His method has now superseded entirely the system of day and night watches so long pursued at Greenwich. We can only very briefly indicate the process.

It has been seen that the mirrors attached to the magnets reflect the divisions of a scale of inches to the right or left, as the magnets move one way or other. Instead of the scale of inches, imagine a lamp continually throwing a narrow ray of light on the mirror in a fixed direction. As the magnet moves, the ray reflected from the attached mirror will turn to one or the other side, and the spot of light which it throws on a screen placed so as to receive it will travel over a greater distance in proportion as the screen is placed farther from the reflecting mirror. Thus, without the smallest friction, we have a spot of light moving over a space which represents, upon any desired scale, the angular motion of the magnet. But now let the surface on which the spot of light shines be of photographic paper, placed in an apartment otherwise dark; let it envelop a cylinder turning round a horizontal axis once in twelve or twenty-four hours, and the path of the luminous spot, from instant to instant, will be recorded by a discoloration of the sensitive paper. This impression is then made permanent, by the usual process, and the papers being removed, are preserved as perpetual records of the continuous fluctuations of the several magnets. To give an idea of the scale on which the registrations are made, we may state that 1° of the declination magnet covers five inches of the photographic scale (corresponding to a circle of twenty-four feet radius); a variation of one thousandth part of the horizontal component of the earth's magnetic force causes a deviation of the spot of light through twenty-four hundredths of an inch on the paper; and a similar variation in vertical force produces a motion of fifty-two hundredths of an inch. The photographic indications are checked by means of four or five readings of the instruments, made daily at convenient hours, according to the old method; and the positions of the magnets at other hours are deduced from a comparison of these with the luminous

tracings. A few of the leading results are deduced numerically from the tracings, and set down in the observation books for printing. But as the precise value of the scale of the tracing is determined each day by a comparison with direct observation, the reading off of each day's tracing requires its own proportional scale to be applied. This is done in a way as simple as it is ingenious. A slip of vulcanized India rubber stretched in a frame, and admitting of extension by turning a screw, has a scale of divisions drawn upon it, which scale may be shortened or lengthened, by means of the screw, until it is adjusted to the scale of the tracing for any particular day, any part of which may thus be read off in correct limits, by merely applying the elastic scale to it.

The light hitherto used for photographing is that of the camphene lamp, but it is expected that a substitute less liable to the annoyance of smoke and occasional derangement will be discovered. The magnets, lamps, and registering cylinders are shut up from the daylight in zinc cases. When an examination of the apparatus is to take place, the window shutters being closed, the superintendent takes a common lamp or candle, protected with a *yellow* glass, which sheds plenty of light, but light containing so few chemical rays as not to affect the sensitive paper whilst his examination is proceeding. We may add that the thermometer and barometer are both photographically registered; the former very simply and effectually, the latter (as might be expected) with less success at present.

The duties of the magnetic and meteorological department, which lately required the undivided attention of four persons, will for the future be performed by two.*

We have thus hastily gone over the chief parts of the Observatory, omitting, however, many minor details; and we must now attempt, in conclusion of this long article, to explain the excellently methodical way in which the onerous duties of this great national establishment are performed by the persons attached to it.

The PERSONAL ESTABLISHMENT has for some years consisted of the Astronomer Royal, G. B. Airy, Esq.; the Chief Assistant, the Rev. R. Main; five Astronomical Assistants; the principal Assistant in the Magnetic Department, Mr. Glaisher, with three other

* The weekly meteorological averages are regularly communicated by the Astronomer Royal to the Registrar General of Births, Deaths, &c., and are published by him in his Reports.

Assistants under him; besides occasional Computers employed from time to time, in number from two or three to as many as fifteen.

And first we have the Astronomer Royal himself, the nature of whose office has been already generally explained. The precise outline of his duties (never very clearly prescribed) has undergone in practice considerable modifications. Whilst the whole business of the Observatory was left to be performed by the astronomer and one assistant only (as was generally the case previous to the appointment of Mr. Pond), the astronomer undertook equally the labors of observation and calculation; but now that the establishment includes eight or nine subordinates, besides occasional computers, it will be easily understood that the adequate direction of so considerable an amount of manual power (for the duties of the subordinates are almost strictly mechanical) affords full employment for the intelligent head who has to direct all, and who is responsible for the labors of all. And, indeed, when we consider the great number of instruments of different kinds in almost hourly use, the number of errors to which each instrument is especially liable, and the vigilance requisite to detect them; the fatigue of the immense calculations connected with the proceeds of almost every observation, and the pertinacity with which errors *will* intrude themselves into every kind of calculation, *especially the simplest*,—when we reflect, besides, that the progress of science is quite as rapid in practical astronomy as in almost any other department, and that the national astronomer is responsible for the character of his observatory, his instruments, and his results, and is ever on the watch for introducing improvements from abroad, or those which his own experience may suggest,—that he has, besides, many duties of a nearly mechanical and official, but of an important, kind, imposed upon him by his connection with the Admiralty,—and farther, that he is frequently called upon by Government for advice on scientific points, requiring much deliberate consideration, or even extensive experiments and the drawing up of elaborate reports; and that all astronomers in England or in the colonies look to Greenwich as a centre of astronomical information and experience, whence help may be looked for and advice obtained;—it must be apparent that an active and energetic Astronomer Royal, like the gentleman who at present, fortunately for science, fills the office, finds his time more

than occupied, without himself making any of the current observations.

The hours of *regular* observatory work are from nine to two o'clock daily, except on Sundays; and for the greater part of this time the Astronomer Royal is to be found amongst the assistants of the astronomical department, in the computing room; where he oversees generally the work of the Observatory, regulates what observations are to be made, receives reports of those made during the preceding twenty-four hours, and generally is open to reference on every subject connected with the instruments, the calculations, or the personal establishment. It is a rule enforced by Mr. Airy, that all communications not of the simplest kind between him and his assistants, are conducted in writing; and thus the daily details of the Observatory, to the minutest particular, are preserved for future reference. The whole of the Astronomer's extensive official correspondence is likewise methodized and preserved. The labor which this entails is rendered comparatively easy by methodical habits acquired through long practice; and a remarkable example of its utility has been shown in the recent publication of the entire correspondence relative to the discovery of Neptune and the perturbations of Uranus, published in the "Proceedings," and also in the "Memoirs of the Royal Astronomical Society." The correspondence includes the smallest scraps of letters which passed on this interesting subject; their ultimate importance in the history of this, the greatest discovery of modern astronomy, could not at the moment have been even guessed at. Those who have read that truly interesting chapter of scientific history will admit, that whilst few persons of the most rigorous business habits could have produced from their archives a correspondence extending over so many years, and so elaborately complete, it would be still more difficult to instance a case displaying more perfect impartiality and frankness than were shown by Mr. Airy on this occasion, under circumstances of singular delicacy.

The Astronomer Royal is more especially responsible for the results of his observations as given to the world. The labor of keeping up the computations to the level of the observations, and of following up both by the irksome correction of the press, must perpetually occupy his most serious attention. From time to time elaborate reports of the state of the calculations are made to him in writing; and, generally speaking,

every printed sheet is revised by him before going to press. Having thus distinctly and day by day before him the whole operations of the Observatory, any irregularity is certain to strike his eye at once and be immediately corrected.

It may be proper to state that the Astronomer Royal receives his appointment by direct warrant from the Crown; and that on the demise of the Sovereign a new warrant is requisite for the re-appointment. He is termed "Our Astronomical Observer," as in the time of Flamsteed. Although responsible to the Board of Admiralty for the charge and delivery of chronometers for the navy, and although he receives from them instructions regarding purely official matters, the astronomer does not consider himself under the direct control of that department. There is, however, one body connected with the Observatory whose functions are too peculiar to be passed over without notice, namely, the BOARD OF VISITORS.

The original appointment (Dec. 14, 1710), by warrant of Queen Anne, of the President, Vice-presidents, and certain Fellows of the Royal Society, selected by the Council to act as Visitors of the Observatory, has already been referred to (page 167). Although the unseemly disputes between Flamsteed and the members of this commission were little creditable to the parties, and although the interference of the visitors was not altogether effectual for the purposes contemplated in the warrant, it must be owned that the appointment of a scientific board of control and inspection, intermediate between the executive government and the Astronomer Royal, was almost essential, and has been attended with the happiest effects; and, so far as we are aware, not a single serious misunderstanding has occurred between the parties since Flamsteed's death. Whilst, on the other hand, the evil consequences of the want of some such power of inspection have been witnessed in other observatories both at home and abroad, where astronomers, after having obtained a lucrative appointment, instead of devoting themselves to their observatories, have wasted or misapplied the time for the employment of which in the scientific service of the public they were in the avowed receipt of public money.

The visitors' warrant has been from time to time renewed without very material alteration,* except that in the more recent (a

copy of the latest is in our hands) the Admiralty is substituted for the Board of Ordnance, as the body to whom the visitors' report is to be made, and the Astronomical Society is united with the Royal Society in having representatives at the Board of Visitors. On the whole, there is rather a greater jealousy shown in these warrants than in preceding ones, of the authority which was originally solely confided to the scientific visitors; and there appears a tendency to throw more power into the hands of the Admiralty, which has not, however, we believe, been in general vexatiously exercised. The annual visitation is held at Greenwich on the first Saturday in June, when usually a considerable concourse of persons interested in science meet at the Observatory, and afterward dine together at the *Crown and Sceptre*. There is no question but that the recurrence of this annual reunion tends considerably to inspire the astronomer in the performance of his retired and sedentary labors. Occasionally, but not often, visitations are held at other periods. It is agreeable to perceive that, owing to the general attention and zeal of successive astronomers, the Board of Visitors have most commonly had the pleasing duty of limiting their reports to recommendations to the Government on the mode by which the suggestions of the astronomer for the advancement of his science may be best carried into effect. Such recommendations have been unusually frequent since Mr. Airy has presided over the Observatory; for no previous Astronomer Royal has taken such unceasing pains to improve to the utmost the facilities afforded him by his position for perfecting both astronomical and other observations.

Were we to single out any specialty by which Mr. Airy's conduct of the Observatory is distinguished from his predecessors, it is in the complete *reduction* of his observations. By *reduction* is technically meant the correction of the bare results recorded by the observer, for all instrumental and other appreciable sources of error, and the comparison of these results with the best existing astronomical theories, so as to afford the basis for still further improving them. Thus every observation of the sun, moon, or planets, is made to represent the right ascension and declination of the body at a given instant; and the "tabular place," or right as-

* See copies of some of these warrants and regulations in Weld's "History of the Royal Society,"

vol. i., p. 400, vol. ii. p. 27, &c., 250, 293. See also "Baily's Flamsteed," pp. 91, 207, and "Rigaud's Bradley," p. lxxii.

cension and declination, computed from the best existing tables, being also calculated (usually by interpolation from the "Nautical Almanack"), the difference is set down as the error of the Tables at that instant. Thus, likewise, the results of every eclipse or occultation observed, are so represented as to give conditional equations for the correction of the elements of the solar or lunar orbits. In like manner, the observations of the stars are combined, and cleared of the effects of precession, aberration, &c.; and the improved star catalogues which are thence deducted, are from time to time inserted in the "Greenwich Observations." It will be seen that all this involves an immense and ever-growing labor, which never was contemplated on the compiling of the earlier volumes of that work.*

The admirable system of reductions commenced by Mr. Airy whilst Director of the Cambridge Observatory, was transferred by him to Greenwich. He appears to have been resolved to render the proceedings of our National Observatory not only the best and completest in the world, but the most accessible to men of science in their results. Accordingly, he voluntarily undertook the superintendence of the reduction of all the lunar and planetary observations of his predecessors since those of Bradley,—commencing with 1750, when, as we have observed in another part of this article, astronomy first became accurate, according to modern notions. This gigantic task, involving the minute discussion and reduction of at least fifteen thousand rough observations, made with a variety of different instruments of various degrees of perfection and adjustment, and extending over eighty years, is the greatest work of the kind that was ever attempted, and the most useful to astronomy. Every observation was compared with the corresponding tabular place, occasioning an equal number (15,000) of laborious computations,—those of the moon especially.† The mere results, printed

in the most abridged form, filled three ponderous quartos, extending to 2200 pages: the expense of this immense undertaking was defrayed by Government, upon an application made by the British Association for the Advancement of Science in 1833. The calculations occupied in their gradual progress at least a dozen years; proceeding latterly with the utmost celerity, as many as sixteen computers being constantly employed in the great room at Greenwich, under the immediate superintendence of Mr. Hugh Breen, who just lived to see the work completed. The summary of these computations, as regards the correction of the lunar elements, is contained in a short paper lately communicated by Mr. Airy to the Astronomical Society (vol. xvii.). It embodies in a few lines the chief results of the System of Greenwich Observatory for nearly a century!

"The process for the correction of the Elements," Mr. Airy wrote in 1846, "is now going on: and the extent of the work, even after so much has been prepared, almost exceeds belief. For the longitude, ten columns are added in groups, formed in thirteen different ways, each different way having on the average about 900 groups. For the ecliptic polar distance five columns are added in groups, formed in seven different ways, each different way having on the average about 900 groups. Thus it will appear that there are not fewer than 150,000 additions of columns of figures." (Report to Visitors, 1846, p. 9.)

This prodigious work can, however, have but few readers. Few, indeed, are even competent to apprehend the greatness of the service it has rendered to science. No laudatory notice of it has appeared, so far as we know, in even one of our literary journals; and if testimony has been borne to its utility in one foreign periodical exclusively devoted to astronomy, the author's main reward for so great and so gratuitous an expenditure of valuable time and anxious toil, must be, that it will be a consciousness of the vastness of the boon conferred by it upon all practical and theoretical astronomers in all time coming; whilst it is also the noblest monument which human hands could rear to the venerated memories of Bradley, Maskelyne, and Pond.

Mr. Airy's Annual Reports to the Board of Visitors (printed in the "Greenwich Observations") present a lively picture of the activity of the Observatory since 1836, and should be read by any person desiring to make himself acquainted with the details of its management. But we refer to them now as showing that the reduction of the old ob-

* It is not to be inferred, however, that such reductions were never made, although not systematically published. Mr. Airy has borne testimony to the industry and accuracy of his predecessors, Maskelyne and Pond, in conducting several important reductions, and especially comparisons of the moon's place with the tables, as proved from MSS. existing at the Royal Observatory. See "Report to Visitors," 1839, p. 3.

† The computation of a single tabular place of the moon, of which the steps are shown in the twelfth "Skeleton Form" of Airy's "Lunar Reductions," vol. i., is itself an undertaking formidable by its extent and repulsive by its intricacy. This had to be 8393 times repeated in duplicate.

servations has been only one of the many important labors in which the Astronomer Royal has engaged solely from scientific zeal, and in addition to his regular official duties. Among these we find a full investigation of the method of correcting ships' compasses in iron-built ships, the organization and reduction of a great series of observations on the tides, particularly in Ireland, besides an elaborate treatise on the theory of tides and waves in the "Encyclopædia Metropolitana." As a member of the commission for restoring the lost national standards of weight and measure, it fell to Mr. Airy's lot to draw up the report embodying the conclusions from a vast mass of evidence. He was likewise a member of the Railway Gauge Commission, and at one time much of his attention was drawn away to that purely mechanical inquiry. When astronomical instruments are to be contrived or adapted for any public service, he is naturally the person to be referred to, and his instructions are frequently required by the parties who are to use them. We must quote one instance of the nature of the services in which his energies have occasion to be directed. It is given in his Report to the Observatory Visitors for 1844.

"In my last report I stated that the officers of the corps of Royal Engineers, who were to trace the Canadian Boundary, had been placed here for instruction and practice in the use of instruments under my eye. The most difficult part of the Boundary was a straight line of nearly seventy miles in length, to join two defined points. The country through which this line was to pass is described as surpassing in its difficulties the conception of any European. It consists of impervious forests, steep ravines, and dismal swamps. A survey of the line was impossible; and a tentative process would have broken the spirit of the best men. I therefore arranged a plan of operations founded on a determination of the absolute latitudes and the difference of longitudes of the two extremities. The difference of longitudes was determined by the transfer of chronometers, by the very circuitous route from one extremity to the other; and it was necessary to divide the whole arc into four parts, and to add a small part by measure and bearing. When this was finished, the azimuths of the line for the two ends were computed, and marks were laid off for starting with the line from both ends. One party, after cutting more than *forty-two miles* through the woods, were agreeably surprised on the brow of a hill, to see directly before them a gap in the woods on the next line of hill: it opened gradually, and proved to be the line of the opposite party. On continuing the lines until they passed abreast of each other, their distance was found to be 341 feet. To form an estimate of the magnitude of this error, it is to be observed, that it implies an

error of only a quarter of a second of time in the difference of longitudes; and that it is only one third of the error which would have been committed if the spheroidal form of the earth had been neglected. . . . Transits were observed and chronometers were interchanged when the temperature was lower than 19° below zero; and when the native assistants, though paid highly, deserted on account of the severity of the weather, the British officers still continued the observations, upon whose delicacy everything depended."

But besides these contributions to the scientific department of the public service, Mr. Airy has during his residence at Greenwich continued to communicate to the Transactions of the Royal Society of London, the Astronomical Society, and the Cambridge Philosophical Society, a multitude of papers on mechanical, optical, and astronomical subjects (including both physical and practical astronomy), which might alone have appeared to give full employment for a man otherwise at leisure. But it is not our business to enter into these details, nor to discuss the philosophical merits of the Astronomer Royal, otherwise than in his strictly official capacity.

There is a good residence attached to the Observatory, and (as we have already remarked) it would be difficult to find a spot which seems to speak more of complete repose and abstraction from the busy world (whose hum, however, is only just beyond earshot) than this forest lodge of Flamsteed House. Shall we wonder, then, if its tenant is still invested, now and then, by popular credulity, with a character uniting the *astrologer* with the astronomer? And yet shall we venture on lowering his reputation in any quarter by admitting our misgivings that, among the manifold talents and acquirements of this excellent astronomer, he may not be able to cast a nativity, or foretell what conjunction of the planets would be favorable to the British Arms. The Boards of Admiralty and Ordnance might in another age have thought that "Our Astronomical Observer" would have been quite as well employed in thus seeking to read the heavens as in rating chronometers, or in drawing boundary lines. It is, at all events, a curious link between the present and the past, that Flamsteed on his accession to Greenwich amused himself by drawing the horoscope of the Observatory,—an accomplishment, perhaps, within the experience of few existing astronomers. Although the link is pretty well broken, there still are persons who believe that our Astronomer Royal is not always contemplating the starry sphere in vain: And, if we are not

misinformed, no long time has passed since a well-dressed female called at the Observatory Gate to request a hint as to the means of recovering a lost sum of money,—and since somebody at Brighton dispatched the liberal sum of *five shillings* in a Post-office order, with a request to have his nativity cast for him in return!*

But if the Magic of astronomy has all but vanished in the 19th century, we also fear that the greater part of its Poetry has evaporated. If a young man has any lingering romance about astronomy, such as we spoke of in the commencement of this article, let him try the post of an ordinary assistant at Greenwich for six months, and we believe that he will be "planet struck" no more. The regular astronomical assistants are five in number, besides Mr. Main, who is in a position of general superintendence, and immediately represents the Astronomer Royal on occasions of unavoidable absence. The work of looking through telescopes is a small part indeed of an assistant's ordinary routine: for five hours daily he is seated at his desk in the computing room, copying figures, taking out logarithms, adding and subtracting; in short, performing the most tedious repetition of the simpler rules of arithmetic, with an apparently endless iteration; and tied down all the while to the impossibility of a mistake as to what to do next, by the Procrustean bed of a "*skeleton form*." Lest these words should appear ominous of any peculiar barbarity practiced in the Greenwich computing room, we will explain their meaning in a single sentence.

It is the very essence of a system of observation that the same thing is to be repeated over and over in the very same manner, perhaps every day or several times a day: thus the taking of every transit consists of the self-same steps; and the corrections requisite for placing of the wires, the error of level and collimation, and the error of the clock, though not always *numerically* the same, enter, however, in every case, into the same part of the correction of the results. Therefore a "*skeleton form*" for entering and correcting a transit observation may be *printed*, in which every step of the observa-

tion or calculation shall be pointed out, and a space left for inscribing the right figures belonging to each particular observation; while in the margin there may be directions to add or subtract, to take a logarithm, or to look in a certain table for a certain correction to be applied in a certain way: thus the operator, following the steps provided for him, can no more go astray than the visitor to the Monument can quit the narrow stair which conducts him from the base to the gallery on the top. However, no pleasant view nor grateful repose awaits the computer, who has toiled to the top, or rather to the bottom, of *his* column. His labor is Sisyphean; he begins just where he left off, without feeling himself either the wiser or better for what he has done. Still, like the mason of the material building within which he is engaged, he has added one brick to the edifice of human knowledge; and grow it will, though unperceived almost by himself. Nor should we omit to add, that the mechanical effort of computation, as it requires habit and dexterity to perform it speedily and correctly, so it strangely enough yet certainly does carry with it a species of quiet pleasure almost peculiar to itself, and which none but those who have voluntarily undertaken long and monotonous calculations are likely to understand. We confess to have passed many hours and days of no mean enjoyment in this mechanical kind of occupation; and few persons acquainted with the practice of accurate science but can bear testimony to the soothing calm which may be induced by the simple act of calculation.*

The Greenwich Observatory assistant is not, however, a calculator merely; nor do his duties actually end with the hours just specified. Several days a week, at least, he

* Of mechanical aids to calculation, the following are the most important:—1. *Logarithms*, by which multiplications and divisions are reduced to additions and subtractions. 2. *Subsidiary Tables*, giving the compendious results of certain calculations which have to be frequently repeated, and which, therefore, may be done commodiously once for all. 3. The *Sliding Rule*, by which the result of multiplications and divisions are found (approximately) by mere inspection. This is used at Greenwich for many simple calculations, such as the proportional parts of clock rates for different hours. 4. *Enlarged Multiplication Table*. Crelle's useful work (2 vols. 8vo.) gives the products of all numbers under 1000 by simple inspection. 5. *Wertheimer's instrument for adding* mechanically. The headwork of adding long columns is spared; the machine carries, and indicates the final result. This is very useful in taking meteorological means. But caution is required to see that the machine acts correctly. 6. *Skeleton Forms*, above explained. Above 100 of these have been printed for current use at Greenwich, and are numbered consecutively. This is independent of a large number used for the old planetary and lunar reductions.

* The following epistolary specimen of the "march of intellect," of the year 1849, has been handed to us from the Royal Observatory.—"I have been informed that there are persons at this Observatory who will, by my enclosing a remittance and the time of my birth, give me to understand *who is to be my wife*. An early answer, stating all relative particulars, will greatly oblige," &c.

is in charge of an instrument, and his duty is, whilst employed in the computing room, to keep his eye on a time-piece indicating *sidereal* time, and having regard also to a list furnished to him of objects which he is required to observe (supposing them sufficiently conspicuous to be visible by daylight through the telescope). Five minutes before the sidereal hour corresponding to the right ascension of the object, he withdraws silently to the transit or circle room, with his metallic pencil and pocket-book in hand, in which he enters the observations; next copies it, with ink, into the "transit book," or the "circle book," as the case may be, and then quietly resumes his interrupted calculation. Of course, however, more objects fall to be observed during the night than during the day; and to regulate the night work of the assistants so as not to render it too oppressive, is one of the Astronomer Royal's indispensable, but very troublesome concerns—to exact what is right and necessary, but not to harass his subordinates with exhausting work of inconsiderable value. Each assistant set down for observing duty on a given day has, as a general rule, to watch for the objects marked as essential to be observed from 3 A. M. (or 15h. in the astronomer's language) to 3 A. M. of the following day. But he is not to sit up the whole night that he may note the place of all the stars which may be on his observing list, unless for some special reason. But he is expected (suppose him to be at the transit) to observe a sufficient number of "clock stars" to ascertain the clock error for that day; and to take as many observations as he can whilst waiting for the moon or a planet, or *Polaris* (used for the verification of the adjustment of the transit instrument). The altitude and azimuth instrument, destined specially for lunar observations off the meridian, is to be used at whatever hour the moon can be seen (by reason of clouds, &c.) between sunset and moonset, or before sunrise and after moonrise. The object being to obtain the moon's place in the parts of her orbit nearest to the sun, a good many morning watches are required every month. Mr. Airy states that this laborious duty is performed by the assistants with great fidelity and zeal.

The assistants have two rooms appropriated to their use (besides Mr. Maine's room) during the intervals of night observations, but none of them reside on the premises. Fortunately for them, a track of bad weather sometimes gives a welcome holiday; whilst a course of uninterrupted sunshine

(which, thanks to our climate, seldom happens) menaces the establishment with fever and apoplexy. The dog-days are the astronomer's harvest time; for (notwithstanding the apparently splendid starlight nights of winter) winter is the real holiday at Greenwich, as an inspection of the printed observations will show. The prevalence of cloudy weather is greatest in the winter and least in the summer quarter. Such is the return given by the "Greenwich Observations" for 1846, although the proportion of covered sky is not so different at different seasons, as an inspection of the printed observations (which show a great preponderance of work done in summer) would lead us to expect. On an average of the whole year 1846, during day and night, *seven-tenths* of the sky are always cloudy! The night on the whole is clearer than the day. The forenoon hours are the most cloudy, the evening least so. It is wonderful on the whole, considering the proverbial badness of our sky, how few days occur altogether blank in the astronomer's year; for proof of which we again refer to the printed "Observations."

There is one remarkable peculiarity which has been found to be connected with the act of observation in astronomy when *time* is to be ascertained: it is what is called the *personal equation* of the observer. This phrase expresses the curious but well-established fact that some persons, equally careful and experienced with others, *invariably* perceive a phenomenon (such as the passage of a star across the wires of the transit instrument) somewhat later in point of time; so that, in the determination of clock rates (the most fundamental of all astronomical determinations), such an observer would make the clock appear to be *too fast* in every instance. In a mutual comparison of personal equations, among twelve persons employed at Greenwich in 1846 ("Greenwich Observations," p. xxvii., &c.), it was found that there was an extreme average difference of *three quarters of a second* between two of these,—a quantity by no means to be safely neglected; consequently, all observations are reduced to the standard of sight of one individual arbitrarily selected. In the recent reduction of the older Greenwich observations this correction was not overlooked; and for this reason (as well as others which are obvious) every observation is entered and printed with the initials of the person making it. From observations with the altitude and azimuth instrument it is believed that, in some peculiar instances, the transit of the *limb* of a

body, with a disc like the moon or a planet, is observed differently (as respects the personal equation) from that of a star.*

The same assistant is never put upon heavy observing work two nights running; nor is he expected to appear in the computing room early in the morning if he has been observing during the night. On the whole, however, the observations are lighter work than the calculations; and the former are always running ahead of the latter. It requires the utmost vigilance on the part of the director to see that the calculations are duly kept up; and for this purpose he has an occasional report made to him (which has been already referred to) of the exact state of every department of calculation or reduction. This document—which is itself a curiosity—gives a better idea of the extent of the labors of computation required to make observations useful to science than anything else could do. It extends to seven printed pages, in small folio, for astronomical calculations, and six pages for magnetism and meteorology; and these pages contain the mere heads or entries of the data and reductions. From these, and from the daily reports of what has been actually observed, the director of the Observatory knows exactly what is doing in each department. Whenever, owing to a course of fine weather, to the appearance of a batch of comets, or any other event which produces over-work in the establishment, the reductions fall considerably behind, the astronomer lays on more computing power, by employing certain occasional assistants, for whose pay he is very judiciously authorized by Government to expend a certain sum annually. This supplementary body has contributed very materially to the efficiency of the Observatory, and has enabled it to secure many most important objects at a very small additional expense. It is easy to see that when so expensive and elaborate an institution as a National Observatory is in full and active operation, an exceedingly small addition of manual power will immensely increase the useful work which it can accomplish.

As a general rule, Sunday is a holiday; only the moon's place is observed and the time-ball dropped,—operations requiring but one assistant, and for a short time. A great improvement this on the looser practice of former times, when observations of all kinds were made on Sundays.

Besides Sunday, the establishment has a

monthly holiday (as far as calculation is concerned). This is judiciously selected at or near new moon, when our troublesome satellite cannot be observed. Each assistant has also from four to five weeks of leave during the year, at such time or times as can be arranged most conveniently for himself. The Astronomer Royal takes a like holiday; and no person in the Queen's dominions deserves it better. Although an old rule of the Visitors provided that he should never be more than ten days absent without leave, at no time was this probably more than a form. The Astronomer Royal and the chief assistant, however, are never absent at once.

The arrangements of the Magnetical Observatory may be inferred, generally, from what has been now stated concerning the Astronomical department. The observations being perfectly regular and uninterrupted day or night, independently of the state of the weather, would seem to be more harassing in that particular; and the observers were originally required to give proof of their actual attendance at the specified hours by pushing in the pin of a *tell-tale*, or *watchman's clock*,—an instrument so contrived as to register the time at which the thrust has been made, and thus insure the presence and wakefulness of the party on duty: but this irksome system of control is now happily superseded by Mr. Brook's invention of the photographic registration of the magnets. With regard to calculations and reductions, those of the magnetic and meteorological department are, on the whole, vastly inferior in point of labor and extent to the astronomical ones.* The calculations of averages are, however, very laborious.

The printing department is not the least oppressive to the Observatory corps. The observations being printed in a form different from that in which they are necessarily entered into the "skeleton forms" for the purpose of reduction, they must be copied for the press. But to avoid the effects of clerical errors, the first proof sheets are read along with the entries in the computing books. Even the unrivalled excellence of London printers cannot supersede the labors of the Observatory assistants. When so many mistakes may occur,—not only from putting one figure for another, but also from error of *sign*, $+$ or $-$, (although this, the

* We must except, however, the determination of *absolute* horizontal intensities; but this most interesting experiment is not often made, and the results appear to be still affected by unestimated sources of error.

* See Mr. Airy's "Report to Visitors," 1849, p. 10.

most fertile, because the simplest, source of all blunders, has been reduced to a minimum through the exclusions of signs, by Mr. Airy, in every practicable case, corrections being, as a general rule, made positive), as well as from misplacing figures in columns imperfectly filled—the utmost vigilance is required, and is never at last *perfectly* successful. The *reading* of a sheet of eight quarto pages employs the time of two assistants for two mornings. It will be seen at once how much labor is consumed in the course of the year in this merely mechanical process. The number of copies printed of the ordinary observations is 350, and the expense is regulated and defrayed by the Stationery Office: it was formerly in the department of the Ordnance.

We have now attempted to give a tolerably complete idea of the manner of working our *one* national and purely scientific establishment,—what is the nature of its occupations, and what has been its measure of success. It is of peremptory necessity, in so populous a vicinity, that the admission to the Observatory itself of the general public should be absolutely interdicted. A suspension of all business and the injury of the instruments would be the inevitable consequence of a different rule; and it appears, from the records of the Observatory and of the Board of Visitors, that these evils have actually occurred. At present, therefore, no one not officially connected with the public service, and not himself a man of recognized scientific character, can be admitted into the Observatory, and these only by a suitable introduction to the Astronomer Royal. Curiosity is naturally enhanced when its gratification is difficult: and it is for this reason that we have tried to give some idea of Greenwich Observatory to those who may not have an opportunity of visiting it themselves; and to render a visit more instructive to those who may be so privileged.

We have said that the instrumental department is now, even at the time we write, undergoing a great, in some measure even a radical, change. Mr. Airy is trying the great experiment of using a more powerful telescope than has yet been applied to divided circular instruments of the highest accuracy; and he is likewise combining the transit and meridian circle into one instrument.* The result of the combination is a

telescope eight inches aperture and twelve feet long, which will be connected with a vertical circle six feet in diameter, the whole being framed in cast iron and mounted upon two independent piers furnished with Y's by means of a transverse axis of great strength. It is not intended, however, to be reversed like a transit instrument, but the line of collimation will be adjusted by means of two fixed telescopes. It will be the joint work of Messrs. Ransome and May of Ipswich, and of Mr. Simms of London. We have already stated that a new zenith tube on an original construction is in progress. It is not hoped that results will be obtained with the transit circle very much superior to those obtained from the excellent instruments hitherto in use; but the state of science generally, and particularly the multitude of small planets recently discovered, call for the application of a higher power, and of telescopes with a greater command of light than those which have heretofore been used. The employment of an enlarged telescope requires the remodeling of every part of the apparatus, so as to support the increased weight.

In drawing this lengthened article to a conclusion, we are bound to make explicit acknowledgments to the Astronomer Royal for the aid he has given us in obtaining the minutest information connected with every part of the Observatory and its management: without which information, it is needless to say, that our intended object could not have been fulfilled.* And while we express our admiration of the singular combination of qualities which he possesses for the management of a National Observatory, we cannot but add our sincere hope, both for his own sake and for the public benefit, that his life and vigor may be long preserved.

Postscript. Since this article was written and put in type, we have had the pleasure of seeing a volume of "Popular Lectures on Astronomy," by Mr. Airy, printed from short-hand notes taken at Ipswich, where the lectures were delivered, in 1848, to a numerous audience of a mixed character. They contain a very clear and popular exposition of the more practical parts of astronomy, couched in plain, precise, and highly graphic language. They are published in a neat form with clear illustrative plates, for

* The plan of a reversible transit circle is due to Römer, who set one up in 1690. After having been abandoned for more than a century, it is now adopted in the finest modern observatories.

* Our thanks are also due to Mr. Main, the assistant-in-chief; and to Mr. Glaisher, the principal assistant in the Magnetic Department, for valuable information politely communicated by them.

behoof of the Ipswich Museum. Had they | to be able to recommend to our readers a
 been sooner in our hands, we should not | work which contains, in so elementary a
 have failed to refer frequently to them in the | shape, so large an amount of valuable and
 course of these pages. But we are happy | accurate information.

From the New Monthly Magazine.

DEATH.

BY LEIGH HUNT.

IN the little story in verse, called the "Inevitable," which appeared in the January Number of this year, there was a description of the terrors of Death.

As the title of the story might lead some readers to draw erroneous conclusions respecting the writer's sentiments on the subject of death in general, which in those lines was only invested with its terrors in consequence of its coming suddenly upon a gay and prosperous courtier, they are here presented with his opinion of it.

DEATH is a road our dearest friends have gone ;
 Why, with such leaders, fear to say "Lead on ?"
 Its gate repels, lest it too soon be tried ;
 But turns in balm on the immortal side.
 Mothers have pass'd it ; fathers ; children ; men,
 Whose like we look not to behold again ;
 Women, that smiled away their loving breath,—
 Soft is the traveling on the road of Death.

But guilt has pass'd it ? Men not fit to die ?
 Oh, hush—for He that made us all, is by.
 Human were all ; all men ; all born of mothers ;
 All our own selves, in the worn shape of others ;
 Our *used*, and oh ! be sure, not to be *ill-used* brothers. }

GERMAN POPULAR PROPHECIES.

LETTER FROM PROFESSOR GREGORY TO THE EDITOR.

DEAR SIR,—The following notice of certain popular prophetic traditions, widely current in the country to which they refer, may perhaps prove interesting to your numerous readers.

All widely-spread opinions, however apparently absurd, have, or have had at some time, a foundation in nature or in historical fact; and it cannot be uninteresting, with a view to the history of popular traditions, to place on record those which I have here collected, even although we cannot at present trace them satisfactorily to their origin. The whole subject of trances, and the various phenomena connected with them, including the second-sight, is one hitherto very imperfectly studied, and for that reason I have not entered into detail on that part of the question; but I may possibly do so at a future period.

EDINBURGH, April 16, 1850.

Believe me, very truly yours,

WILLIAM GREGORY.

It is well known that in all ages, and in most countries, prophetic traditions have been said to exist; and although it may often have happened that such traditions may have arisen from spurious prophecies, written after the event, and falsely said to have existed before it, yet it would also appear that genuine prophecies have from time to time appeared, and become traditions before the events took place. Of course, we do not here allude to the Scriptural prophecies, but to such as have no pretensions to a divine origin. There can be little doubt that the Sybilline Books contained prophecies of the future fate of Rome; and although we cannot now ascertain, even if this were the case, whether they were accurate predictions, or merely sagacious guesses, nor whether the event confirmed them, yet the tradition of their existence is in itself curious. We cannot here enter into an enumeration of the various prophecies which are said to have existed, in ancient or modern times, before the events occurred, but on some future occasion we may return to that subject: in the mean time we may allude, as a modern example of popular prophecy in our own country, to the prediction of the extinction of the male line of the house of Seaforth, in the person of a deaf Caberfae—a prediction which Mr. Morritt of Rokeby, the friend of Scott, heard quoted in Ross-shire at a time when the last Lord Seaforth, who became quite deaf, had several sons in perfect health. We have no doubt our Highland readers are acquainted with many analogous cases.

Our present object is to direct attention to the fact, that in Germany, more especially on the Rhine and in Westphalia, there exist many remarkable popular prophecies concerning public events, of various dates, and

originating in various quarters, but exhibiting a remarkable coincidence in many of the chief points. Many of these have been printed at various times; others exist as traditions among the peasantry; others, again, are said upon good evidence to have been in modern times taken down from the lips of the prophets themselves, all or most of whom are now dead. Yet they generally predict, and often with strange minuteness of detail, events which were to occur about this time,—viz., in 1848, 1849, and 1850. Political and religious convulsions, wars, and finally peace and prosperity, form the burden of them; and we shall see that the events of 1848 and 1849 supply apparently strong confirmation of their truth, their previous existence being admitted.

Having spent some months in Rhenish Prussia during the summer of 1849, we made many inquiries on the subject, and found everywhere, and among all classes, a firm conviction of the *genuineness* of many of the popular prophecies; while it was admitted that they had long been known and believed by the people. As the matter, considered under any point of view, is a curious and interesting one, we procured the latest work on the subject, which in fact appeared while we were in Germany. It is entitled, "Prophetic Voices, with Explanations. A collection as perfect as possible, of all Prophecies, of Ancient and Modern date, concerning the Present and Future Times, with an explanation of the obscure parts," by Th. Beykirch, licentiate in Theology, and (R.C.) curate in Dortmund. The worthy Curate is often too brief in his accounts of the prophecies themselves, and very diffuse in his explanations, which, for the most part, tend to extract from the predictions the comfortable assurance of

the complete re-establishment of the Roman Catholic religion and the utter discomfiture of Protestantism. He even treats his readers to a disquisition, altogether out of place, on Scriptural prophecies, and an interpretation, by Holzhäuser, of the Apocalypse, in which he applies to Protestantism the same passages which Protestants apply to the Papacy, and does so, apparently, very much to his own satisfaction. We shall not touch on these parts of his work, but use it as a storehouse, from which we may draw the predictions themselves, without regarding them through the theological medium of the reverend author.

The first we shall mention is of an ancient date. It is the vaticination of Brother Herrmann, a monk of the monastery of Lehnin, who flourished circa A. D. 1270, and died in the odor of sanctity. It is written in a hundred leonine hexameters, rhyming in the middle and end of each verse, and was printed in 1723 by Professor Lilienthal, from what was said to be an old MS. His prophecies chiefly concerned the future fate of his own monastery of Lehnin in Brandenburg, and of the monastery of Chorin in the Uckermark, a part of Brandenburg. But as that fate depended on public events, more especially on the history of the princes of that country, his vaticination assumes the form of a brief prophetic history of the house of Hohenzollern, that is, the now royal house of Prussia. Our readers will probably readily dispense with the whole of the original hexameters of the good monk, but we shall give a few specimens: he begins—

1. "Nune tibi, cum cura, Lehnin! cano fata futura,

2. Quæ mihi monstravit Dominus, qui cuncta creavit," &c.

"Now, oh Lehnin! I sing with sorrow to thee thy future fates,

Which the Lord, the creator of all, has shown to me."

He proceeds to describe the prosperity of Lehnin under the race of Otto I., and its decay after the extinction of this family, which took place in the person of Henry III., 1320. These princes were from Anhalt, of the race called the Askanier in Germany history.

At verses 14 *et seq.*, he describes Brandenburg as becoming a den of lions, while the true heir is excluded. After Margrave Henry III., the Dukes of Pomerania, Mecklenburg, Brunswick, Anhalt, Electoral Saxony, and Bohemia attacked the Mark, (Brandenburg,) and committed horrible devastations.

The Emperor Louis of Bavaria seized it for himself, excluding the princes of Saxony, the nearest heirs to the former princes.

After various details concerning the fate of Brandenburg, plundered by robber knights and barons, who were to be put down by a strong emperor, as happened under Charles IV., who died in 1378—he comes to the accession of the Hohenzollerns, and describes the first prince of that family as rising to distinction by holding two castles or Burgen. The Emperor Sigismund sold Brandenburg to Frederick Burggraf of Nuremberg, of the house of Hohenzollern. He belonged to the lower nobility, but now became more important by the possession of two castles—those of Nuremberg and Brandenburg. These examples are sufficient to give an idea of that part of Brother Herrmann's prophecy, concerning events which preceded the printing of it in 1723, and in which he describes *seriatim*, without giving the names, and very briefly, but in striking language, the fate and character of the successive Margraves, Electors, and Kings, till he comes to Frederick William I., who died in 1740, seventeen years after the prophecy was printed, and whose character and death he describes. Then follows Frederick the Great, whose career, with its vicissitudes, is indicated with tolerable clearness. One line is curious.

84. "Flantibus hinc Austris, vitam vult credere claustris."

"When the south wind blows, he trusts his life to the cloisters."

In fact, Frederick, when hard pressed by the Austrians, was once compelled to conceal himself in a monastery.

Auster signifies south wind, but is probably here used for Austria.

After his successor, Frederick William II., whom the good monk truly describes as vicious, sensual, and oppressive, but not warlike, comes this line,—

89. "Natus florebit; quod non sperasset habebit."

"The son shall flourish; he shall possess what he did not hope for."

The application of this to the late king, Frederick William III., is obvious. Under him, Prussia, after having been reduced to the lowest ebb by Napoleon, became, unexpectedly, far more powerful than it had ever been.

90. "Sed populus tristis flebit temporibus istis.

92. "Et princeps nescit quod nova potentia crescit."

"But the sad people shall mourn in these times ;
"And the King shows not that a new power is arising."

These lines also apply well to Frederick William III.

93. "Tandem sceptrum gerit, qui ultimus stemmatis erit"

"At length he bears the sceptres, who shall be the last of his race."

Now this is very remarkable. In line 49, he had said—

49. "Hoc ad undenum durabit stemma venenum."

"This poison* shall last to the eleventh generation."

The present king, Frederick William IV., is the eleventh from Joachim III., the first Protestant prince of Brandenburg, in reference to whom the above line is written. But why did the writer (even supposing the prophecy not to have existed earlier than 1723, when it was printed) stop at this point? We shall see that other prophecies coincide with this one in predicting that the present will be the last king of Prussia.

Then comes the remarkable line—

95. "Et pastor gregem recipit, Germania regem."

"And the shepherd receives his flock, Germany a king."

The worthy curate of Dortmund explains this as pointing out the submission of Europe to the Pope, and of Germany to one sovereign. Brother Herrmann goes on to predict peaceful times, and the restoration of Choria and Lehnin to their pristine splendor.

We have omitted many curious lines, but the reader will probably feel satisfied that the brief and obscure vaticinations of Brother Herrmann are worthy of notice, especially that part of them relating to the last hundred and twenty years, bearing in mind that they were printed in 1723.

The next prophet mentioned by our author is Joseph von Görres, who died in January, 1848—that is, before the last revolution in France, which shook the thrones of Europe. On his death-bed he lamented the misfortunes about to come on Poland, described Hungary as appearing to him one huge field of carnage, and wept over the approaching downfall of the European monarchies. The events of February and March, 1848, the insurrec-

tion in Posen, the devastations committed by the Prussians in suppressing it, and the war in Hungary, would appear to be the events to which he referred. But he was a man deeply read in history, and there are some of those prophetic hints which may possibly have occurred to him as reflections on probable events, and have assumed a certain degree of vividness in his mind.

We now come to a peasant prophet, namely, Jaspers, a Westphalian shepherd, of Deininghausen, near the ancestral seat of the Lord of Bodelschwing. He was a simple-minded, pious man. In 1830, soon after which time he died, he publicly predicted as follows:—

"A great road (said he) will be carried through our country, from west to east, which will pass through the forests of Bodelschwing. On this road, carriages will run *without horses*, and cause a dreadful noise. At the commencement of this work, a great scarcity will here prevail; pigs will become very dear, and a new religion will arise, in which wickedness will be regarded as prudence and politeness. Before this road is quite completed, a frightful war will break out."

These words, to the astonishment of the natives, have nearly all been fulfilled. The railway from Cologne to Minden has, since his death, been carried through the very district he mentioned in 1830, before the first English railway had been opened, and when the primitive shepherds of Westphalia were little likely to know anything about railways. The scarcity took place at the time specified; and his remark as to a new religion is supposed to apply to a deterioration of manners among the simple natives, consequent on the opening up of their district. A personal friend of Jaspers collected the following sayings, which the author, after minute inquiry on the spot, considers as genuine.

1. "Before the great road is *quite finished*, a dreadful war will break out."

The railway has for a year or two been in operation; but, up to the end of 1849, as we saw by advertisements, the second line of rails was not laid down. It is probably still only in progress. Now in 1848 and 1849, we have seen war in Schleswig-Holstein, Hungary, Italy, Posen, and Baden.

2. "A small northern power will be conquered."

Probably the Danish war, and the success of Denmark, is here meant.

3. "After this another war will break out—not

* Protestant heresy.

a religious war among Christians, but between those who believe in Christ, and those who do not believe."

Here we must remember that the simple and ignorant peasants of Westphalia have strong religious feelings and prejudices, and are apt, like some nearer home, to apply the term infidel somewhat rashly. Possibly Russia and the Greek church may be here alluded to.

4. "This war comes from the East. I dread the East.

5. "This war will break out very suddenly. In the evening they will cry 'Peace, peace!' and yet peace is not; and in the morning the enemy will be at the door. Yet it shall soon pass, and he who knows of a good hiding-place, for a few days only, is secure."

The probability of a war, in which Russia shall take an active share, cannot escape any observer of the signs of the times; and, with the aid of railways, which were not known at the date of Jaspers' death, the sudden outbreak is quite possible, even in Westphalia.

6. "The defeated enemy will have to fly in extreme haste. Let the people cast cart and wheels into the water, otherwise the flying foe will take all carriages with them.

7. "Before this war, a general faithlessness will prevail. Men will give out vice for virtue and honor, deceit for politeness.

8. "In the year in which the great war shall break out, there shall be so fine a spring, that in April the cows will be feeding in the meadows on luxuriant grass. In the same year, wheat may be harvested, (in his district,) but not oats." (This appears to be likely to apply to 1850.—W. G.)

He seems here to hint that the harvest of oats will be interrupted by the war; if so, the war occurs in autumn.

9. "The great battle will be fought at the birch-tree, between Unna, Hamm, and Werl. The people of half the world will there be opposed to each other. God will terrify the enemy by a dreadful storm. Of the *Russians*, but few shall return home to tell of their defeat. Jaspers described this battle as terrific."

We shall by and by hear more of this birch-tree.

10. "The war will be over in 1850, and in 1852 all will be again in order.

11. "The Poles are at first put down; but they will, along with other nations, fight against their oppressors, and at last obtain a king of their own.

12. "France will be divided internally into three parts."

It is curious to notice, that at present, although the state of matters in 1830 was very different, there are three parties in France, all of them powerful: namely, the Buonapartists, (with at least a part of the Orleanists,) and the moderate as well as the *pro tempore* Republicans, headed by Louis Napoleon; the party of the old Bourbons and the priests, led by Falloux and the old nobility, such as Larochejaquelein and Montalembert; and lastly, the Red Republicans, Socialists, and Communists. These three parties hold each other in check, and no one of them can at this moment do much.

13. "Spain will not join in the war. But the Spaniards shall come after it is over, and take possession of the churches.

14. "Austria will be fortunate, provided she do not wait too long.

15. "The papal chair will be vacant for a time.

16. "The nobility is much depressed, but in 1852 again rises to some extent.

17. "When asked as to the future of Prussia, he maintained an obstinate silence, saying only that King Frederick-William IV. would be the last."

This agrees with Brother Herrmann, as formerly stated. A man named Pottgiesser, in Dortmund, long since dead, drew up a genealogical tree of the royal house, in which he says of the present king—to whom he gives no successor—"He disappears."

18. "There will be one religion. On the Rhine stands a church which all people shall aid in building. From thence, after the war, shall proceed the rule of faith. All sects shall be united; only the Jews shall retain their old obstinacy."

The dome at Cologne is obviously alluded to. We shall see, hereafter, that Cologne is expected to become the seat of ecclesiastical rule by other prophets."

19. "In our district priests shall become so rare, that after the war, people will have to walk seven leagues in order to attend divine service.

20. "Our country will be so much depopulated, that women will have to cultivate the soil; and seven girls shall fight for a pair of inexpressibles.

21. "The house of Ikern shall be set on fire by shells.

22. "The soldiers shall march to battle (or to war) first, then return, decked with the cherry blossoms. And only after that shall the great war break out."

In spring 1848, troops marched to Baden, at the time of the first insurrection there, in which war General von Gagern was killed;

and they returned home decked with cherry blossoms.

23. "Germany shall have one king, and then shall come happy times.

24. "He spoke also of an approaching religious change, and warned his children, when that time should come, to go to Mengede."

When jeered on his prophetic powers, Jaspers often said—

"When I have long been in the grave, you will then often remember what I have said."

There is a prophet in Dortmund, who, among other curious things, said, in 1840, "When the Prussian soldiers shall be dressed like those who crucified our Lord, then war shall break out with great violence." It is worthy of notice that, since that time, the whole Prussian army, with the exception of the Hussars, have been armed with helmets of Roman form. Their new *Waffenrock*, or military coat, is also a short plain surtout, buttoned to the throat, and probably not unlike a Roman tunic.

The predictions of Jaspers are curious—first, on account of their minuteness; secondly, because they specify dates yet future. We shall see that they coincide, in many of the chief points, with other popular prophecies. The next prophet is *Spielbähn*, a Rhenish peasant. "*Spielbähn*" signifies, in the dialect of his countrymen, "the fiddler;" and this name was given to him on account of his skill as a rustic performer on the violin. He was employed as messenger and servant in the convents of Siegburg and Heisterbach. His predictions have been published by Schratzenholz, and widely circulated; but, as we could not procure this work, we can only give such extracts as our author has selected.

Spielbähn died in 1783, in Cologne. He is said to have been rather addicted to the wine-flask, and to have occasionally indulged in predictions of doubtful authenticity, possibly from interested motives. But he is thought, in the main, to have uttered what he really believed to be true predictions, and he gave them out as visions. He predicted the imprisonment of the Archbishop of Cologne, which took place a few years ago, with many less interesting local occurrences, which our author passes over. Speaking of the present time (1848-50), and of what should follow, he said—

1. "In that time it will be hardly possible to distinguish the peasant from the noble."

In Rhenish Prussia, where the Code Napoleon prevails, there is hardly a trace of

the splendor of the old aristocracy to be found. The nobles of old family who remain have lost all exclusive privileges, and are poor.

2. "Courtly manners and worldly vanity will reach to a height hitherto unequalled. Yea, things will go so far, that men will no longer thank God for their daily bread.

3. "Human intellect will do wonders (or miracles), and on this account men will more and more forget God. They will mock at God, thinking themselves omnipotent, because of the carriages, which shall run through the whole world (or everywhere), without being drawn by animals.

4. "And because courtly vices, sensuality, and sumptuousness of apparel, are then so great, God will punish the world. A poison shall fall on the fields, and a great famine shall afflict the country."

In Nos. 3 and 4, railways and the potato blight seem meant.

5. "When a bridge shall be thrown across the Rhine at Mondorf, then it will be advisable to cross, as soon as possible, to the opposite shore. But it will only be necessary to remain there so long as a man will take to consume a 7 lb. loaf of bread; after which (that is, in less than a week) it will be time to return."

This coincides with Jaspers' prediction of the shortness of the last great struggle.

6. "Thousands shall conceal themselves in a meadow among the seven mountains (opposite Bonn).

7. "I see the destruction of the heretics, with dreadful punishments; of those who dared to think their puny minds could penetrate the councils of God. But the long-suffering of God is at an end, and a limit is put to their wickedness."

The worthy curate dwells with peculiar satisfaction on this prediction.

8. "Observe well, thou land of Berg! Thy reigning family, which proceeds from a Margrave, shall suddenly fall from its high station, and become less than the smallest Margrave."

The grand-duchy of Berg, on the Lower Rhine, of which Düsseldorf is the chief town, was given by Napoleon to Murat, and was afterward part of the kingdom of Westphalia, but since the peace, has formed part of Prussia, the royal family of which, as we have seen, descends from the Margraves of Brandenburg; but in 1783 all this was as yet in the womb of time. See also Jaspers No. 17, and Brother Herrmann, verse 93.

9. "The false prophets (heretic clergy?) shall be killed with wife and child.

10. "The holy city of Cologne shall then see a fearful battle. Many, of foreign nations, shall here be killed, and men and women shall fight for their faith. And it will be impossible to avert from Cologne, up to that time spared by war, all the cruel extremities of war. Men will then wade in blood to the ankles.

11. "But at last a foreign king shall arise, and gain the victory for the good cause. The survivors of the defeated enemy fly to the *birch-tree*; and here shall the last battle be fought for the good cause."

See Nos. 9 and 33 of Jaspers' sayings, as to the *birch-tree* and the German king; also verse 95 of Brother Herrmann.

12. "The foreign armies have brought the "black death" into the land. What the sword spares the pestilence shall devour. Berg shall be depopulated, and the fields without owners; so that one may plough from the river Sieg up to the hills without being (*Scoticè*) challenged. Those who have hid themselves among the hills shall again cultivate the land."

See No. 20 of Jaspers' predictions.

13. "About this time France will be divided internally."

See Jaspers, No. 12.

14. "The German Empire shall choose a peasant for Emperor. He shall govern Germany a year and a day."

The Archduke John, late regent of the empire, had long lived, banished from court, as a Styrian peasant, adopting the costume and manners of the peasantry. He also married a peasant girl. His regency lasted little more than a year, and, indeed, after the year had expired, he only returned to Frankfurt in order to resign his power to the present commission.

15. "But he who after him shall wear the imperial crown, he will be the man for whom the world has long looked with hope. He shall be called Roman Emperor, and shall give peace to the world. He shall restore Siegburg and Heisterbach (two convents, above mentioned).

16. "Then shall there be no more Jews in Germany, and the heretics shall beat their own breasts.

17. "And after that shall be a good happy time. The praise of God shall dwell on earth; and there shall be no war, except beyond the seas. Then shall the fugitive brethren return, and dwell in their homes in peace for ever and ever.

"Men should heed well what I have said, for much evil may be averted by prayer; and al-

though people jeer me, saying I am a simple fiddler, yet the time will come when they shall find my words true."

See Jaspers' predictions, Nos. 18 and 23. Brother Herrmann, also, in verses 96-100, prophesies happy times, and the restoration of the convents of Chorin and Lehnin.

The next seer is Anton (Anthony), called the Youth of Elsen, a village near Paderborn, in Westphalia. He had the gift of the "second sight"—that is, he saw visions—and has a great reputation in that country as a true seer. His predictions were first collected by Dr. Kutscheit, from whose work the author extracts as follows. The date is not given by our curate.

1. "When the convent of Abdinghof is occupied by soldiers, armed with long poles, to which little flags are attached, and when these troops leave the convent, then is the time near."

At this time (1849) Prussian lancers occupy the convent, which has been converted into a barrack. This was not the case when the prediction was made.

2. "From Neuhaus, houses may be seen on the Bock (Buck), and a village is founded between Paderborn and Elsen. Then is the time near."

The Bock is a wooded eminence near Paderborn, where an inn was built. To obtain a fine view from the inn, the wood was lately cut through, and thus the buildings have become visible from Neuhaus. The village or *dorf* is a newly-founded country house, or rather farm-house, with its appurtenances—*Scoticè*, a town.

3. "When people see, in the Roman field, houses with large windows; when a broad road is made through that field, which shall not be finished till the good times come, then shall come heavy times."

In the Roman field, on the high road to Erwitte, the Thuringian Railway was begun in 1847, and a terminus, the buildings of which have very large windows, has been laid down on the spot. The works have been, from the necessity of the times, suspended for the present. See Jaspers, No. 1, and Spielbähn, No. 3.

4. "When barley is sown on the Bock, then is the time close at hand. Then shall the enemy be in the land, and kill and devastate everything. Men will have to go seven leagues to find an acquaintance. The town of Paderborn shall have eight heavy days, during which the enemy lies there. On the last day, the enemy shall give up

the town to plunder. But let every man carry his most valuable property from the ground floor to the garret; for the enemy will not have time, even to untie his shoestrings, so near will succor be."

In the summer of 1848, the first attempt was made to grow barley on the Bock, a cold, high-lying district.

5. "The enemy will try to bombard the town from the Liboriberg (a hill close to Paderborn); but only one ball (or shell) shall hit, and set on fire a house in the Kampe. The fire, however, shall soon be extinguished.

6. "The French shall come as friends. French cavalry with shining breastplates (cuirassiers) shall ride in at the Westergate, and tie their horses to the trees in the Cathedral close. At the Giersthor (another gate), soldiers with gray uniforms, faced with light blue, shall come in. But they will only look into the town, and then immediately withdraw. On the Bock stands a great army, with double insignia (or marks—possibly the two cockades, Imperial German and Prussian, now worn by the Prussians), whose muskets are piled in heaps.

7. "The enemy shall fly toward Salzkotten, and toward the heath. In both places a great battle shall be fought, so that people shall wade in blood to the ankles. The pursuers from the town must take care not to cross the Alme bridge; for not one of those who cross it shall return alive.

8. "The victorious prince shall enter, in solemn procession, the castle of Neuhaus, which shall be repaired (for the occasion?) accompanied by many people with green boughs in their hats. On the Johannes Bridge, before Neuhaus, there shall be such a crowd that a child shall be crushed to death. While this goes on a great assembly shall be held in and before the Rathhaus (Town House). They shall hurry (or drag) a man down from the Rathhaus, and hang him on a lamp-post before it.

9. "When all these things shall have come to pass, then shall there be a good time in the land. The convent (of Abdinghof) shall be restored; and it will be better to be a swineherd here, in our land, than a nobleman yonder in Prussia (proper)."

Next comes an old traditionary prophecy concerning Münster.

"Woe to thee, Münster! Woe to you, priests, doctors, and lawyers! How shall it be with you in the days of sorrow?"

"For three days they shall go up and down thy streets. Three times shall the city be taken and lost.

"Let every man keep in the garret; thus shall he be safe. A dreadful fire shall break out in and destroy Ueberwasser, so that it may be seen from the cathedral place to the castle.

"The enemy shall be beaten, and shall fly

through Kinderhaus so fast that they leave their cannon on the street. All this shall happen in the same year in which an illustrious person dies in the castle.

"The conquering prince shall make his entry through the Servatii-Thor, (a gate.)"

Part of this prophecy has been spread over the district of Münster for sixty years; part of it comes from the tailor at Kinderhaus, who also prophesied much to Blücher. He was one of the seers, or, as they are called in that country, "Spoikenkikers." "Spuck," in high German, signifies ghost or spirit; "Kiker" is our Scotch word "Keeper,"—in high German, "Gucker."

The next is an old prophecy concerning Osnabrück.

"Osnabrück shall suffer much for fourteen days, and see a bloody contest in her streets.

"Even the service of the Greek Church shall be performed in the churches of Osnabrück."

This is quite possible, should Russians enter Westphalia. See Jaspers, No. 9.

"A violent contest shall arise between Catholics and Protestants. All the churches shall be again taken possession of by the Catholics.

"A priest, in the act of carrying the most Holy (the Host) into the Lutheran Church, shall be killed by a ball at the church door."

The three preceding prophecies are very remarkable, from the minute details which they contain, and which seem to indicate that the seers described *what they saw* in visions or in dreams. Of course, most of these visions, referring to events yet future, cannot be at present verified. But the signs given by Anton, to know when the time approaches, have come to pass.

The following traditionary prophecy about Cologne, was found by Magister Heinrich von Judden, pastor of the small church of St. Martin, in the convent of the brethren of the Holy Virgin of Carmel, (in Cologne?)

"O happy Cologne! when thou art well paved, thou shalt perish in thine own blood. O, Cologne! thou shalt perish like Sodom and Gomorrah; thy streets shall flow with blood, and thy relics shall be taken away. Woe to thee, Cologne! because strangers suck thy breasts and the breasts of thy poor,—of thy poor, who therefore languish in poverty and misery."

Old tradition concerning Coblenz:—

"Woe! woe! Where Rhine and Moselle meet, a battle shall be fought against Turks and

Baschkirs, (Russians?) so bloody, that the Rhine shall be dyed red for twenty-five leagues."

Traditions of battles in Westphalia:—

"A prodigious number of people shall come from the east toward the west.

"The whole west and south shall rise against them.

"The armies shall meet in the middle of Westphalia.

"A dreadful battle shall take place on the Strönheide (a heath), near Ahaus.

"At Reisenbeck, a bloody combat shall be fought.

"At Lüdinghausen," said a seer, "I saw whole hosts of white-clad soldiers, (Austrians?)

"Ottamarsbocholt will have much to suffer.

"On the Lipperheide (a heath) a bloody battle is fought.

"Also in Rittberg, and the whole country round, a battle shall be fought.

"But the chief engagement shall be at the *Birch-Tree*."

Every one, says the author, who takes the trouble, can hear all this from the mouths of the peasantry. In many places the seers have even described the positions of the troops, and the direction in which the cannon are pointed.

Prophecy of a Capuchin monk in Düsseldorf, of date 1672:—

"After a dreadful war (Napoleon's wars?) shall there be peace; yet there shall be no peace, because the contest of the poor against the rich, and of the rich against the poor, shall break out.

"After this peace shall come a heavy time. The people shall have no longer truth nor faith.

"When women know not, from pride and luxuriousness, what clothes they shall wear—sometimes short, sometimes long, sometimes narrow, sometimes wide; when men also change their dress, and wear everywhere the beards of the Capuchins,* then will God chastise the world. A dreadful war shall break out in the south (Hungary?) and spread eastward and northward. The kings shall be killed. Savage hordes shall overflow Germany, and come to the Rhine. They shall take delight in murdering and burning, so that mothers, in despair, seeing death everywhere before their eyes, shall cast themselves and their sucklings into the water. When the need is greatest, a preserver shall come from the south. He shall defeat the hordes of the enemy, and make Germany prosperous. But, in those days, many parts shall be so depopulated, that it will be necessary to climb a tree to look for people afar off."

An old prophecy concerning the battle of the *Birch-Tree*:—

*This is now the case in Germany.

"A time shall come when the world shall be godless. The people will strive to be independent of king or magistrate, subjects will be unfaithful to their princes. Neither truth nor faith prevails more. It will then come to a general insurrection, in which father shall fight against son, and son against father. In that time men shall try to pervert the articles of faith, and shall introduce new books. The Catholic religion shall be hard pressed, and men will try with cunning to abolish it. Men shall love play and jest, and pleasure of all kinds, at that time. But then it shall not be long before a change occurs. A frightful war shall break out. On one side shall stand Russia, Sweden, and the whole north; on the other, France, Spain, Italy, and the whole south, under a powerful prince. This prince shall come from the south. He wears a white coat, with buttons all the way down. He has a cross on his breast, rides a gray horse, which he mounts from his left side, because he is lame of one foot. He will bring peace. Great is his severity, for he will put down all dance-music and rich attire. He will hear morning mass in the church at Bremen. (According to some traditions, he will read mass.) From Bremen he rides to the Haar, (a height near Werl;) from thence he looks with his spyglass toward the country of the Birch-Tree, and observes the enemy. Next he rides past Holtum, (a village near Werl.) At Holtum stands a crucifix between two lime-trees; before this, he kneels and prays with outstretched arms, for some time. Then he leads his soldiers, clad in white, into the battle, and, after a bloody contest, he remains victorious.

"The chief slaughter will take place at a brook which runs from west to east. Woe! woe! to Budberg and Söndern in those days! The victorious leader shall assemble the people after the battle, and address to them a speech in the church."

So runs the above prophecy, according to the concurring testimony of many peasants in that country. It was long ago printed in a small pamphlet, in the convent at Werl. But, at the removal of the convent, all its books were lost or destroyed. The tradition, however, remained among the peasantry, and has even penetrated into France; for when French (troops?) came to Werl, they inquired for the Birch-Tree. In Pomerania also, natives of Westphalia, when quartered there, have been questioned about its position. It stood long between Holtum and Kirch-Hemmerde, villages lying between Unna and Werl. When it withered, a new one was, by royal order, planted on the spot. This proves that the Government knew of the prophecy or tradition, and felt an interest in it. The people believe so firmly in the prophecy, that the peasantry near Werl even opposed the introduction of new hymn-books, under the impression that they were the pre-

dicted *new books*. Bremen, Holtum, Budberg, and Söndern are villages near Werl. A crucifix stands at Holtum between two young lime-trees; and a brook there flows from west to east.

Another old prophecy of the battle of the Birch-Tree. This prophecy was printed at Cologne in 1601, in Latin. The title, translated, is as follows:—

“A prophecy concerning the frightful contest between South and North, and a terrific battle on the borders of the duchy of Westphalia, near Bodberg (Budberg). From a book, entitled, *A treatise on the heavenly regeneration (or restoration)*, by an anonymous author, illuminated (or enlightened) by visions. With permission of the Officialate at Werl. Cologne, 1701.”

It was translated and printed in German by the monks of Werl, but, as already stated, their library was destroyed or dispersed.

“After these days shall dawn the sad unhappy time, predicted by our Lord. Men, in terror on the earth, shall faint for expectation of the coming events. The father shall be against the son, and the brother against the brother. Truth and faith shall no longer be found. After the nations, singly, have long warred against each other, after thrones have crumbled, and kingdoms been overthrown, shall the entire South take arms against the North. (*Auster contra Aquilonem.*) Then country, language, and faith shall not be contended for, but they shall fight for the rule of the world.”

“They shall meet in the middle of Germany, destroy towns and villages, after the inhabitants have been compelled to fly to the hills and the woods. This dreadful contest shall be decided in Lower Germany. There the armies shall pitch camps, such as the world has not yet seen. This fearful engagement shall begin at the *Birch-Tree* near Bodberg. Woe! woe! poor Fatherland! They shall fight three whole days. Even when covered with wounds, they shall mangle each other, and wade in blood to the ankles. The bearded people of the seven stars (?) shall finally conquer, and their enemies shall fly; they shall turn at the bank of the river, and again fight with the extremity of despair. But there shall that power be annihilated, and its strength broken, so that hardly a few will be left, to tell of this unheard-of defeat. The inhabitants of the allied places shall mourn, but the Lord shall comfort them, and they shall say, It is the Lord's doing.”

The two preceding prophecies, both old, and printed long since, have probably a common origin, whatever that may be. The tradition has probably come to the people from the monks of Werl.

Some predictions or visions, connected with the prophecy of Werl:—

A seer, named Rölinc, of Steinen, who has been dead some time, prophesied of three processions in Kirch-Hemmerde.

“The first shall be a funeral procession. The names of several men shall be hung up on the church.”

This happened when, in the war of 1813–15, some brave men of this district fell in battle.

“The second procession shall go from the old church to the new one.”

This took place when the Catholics of Kirch-Hemmerde built a new church; and the Host was carried from the *Simultankirche* into the new edifice.

“The third shall be after a dreadful war. Then shall Catholics and Protestants again go together in procession into the old church, and have one religion.”

He said further,—

“When two towers are built between Söndern and Werl, then shall a frightful war soon break out.”

The towers are now there, having been lately built. One is a chimney for the Salt-Works; the other a *Bohrthurm* (a tower over the pit whence the salt spring is pumped up).

Another seer, named Ludolf, saw the whole order of battle of both armies, and pointed out in a corn-field near Kirch-Hemmerde the spot, near the *Birch-Tree*, where he saw in his vision a colonel fall from his horse, struck by a ball. The horse, he said, would run to a sheaf of oats (therefore late in autumn), snap at it, and in the same moment fall, also pierced by a shot.

A third seer, Hermann Kappellmann, of Scheidengen, near Werl, prophesied as follows, thirty years ago (1819), before a whole company.

“The times are yet good, but they shall change much. After many years a frightful war shall break out. The signs shall be: When in spring he cowslips appear early in the hedges, and disturbances prevail everywhere; in that year the explosion does not take place. But when, after a short winter, the cowslips bloom very early, and all appears quiet, let no man believe in peace.

“When great wisps of straw stand on the *Bärenwiese* (Bear's meadow), then shall the war break out.”

The *Bärenwiese* is a large common mead-

ow at Scheidengen. Soon after the French and Polish revolutions of 1830 it was divided, and on that account wisps of straw were set up. The people believed the great war was then at hand. Now there are once more wisps of straw set up to mark the line of the railway to Cassel, which is in progress.

"When you then hear cannon from the side of Münster, then hasten to cross the Ruhr, and take bread (a loaf) with you sufficient for three days. He who only puts his foot in the water shall be safe from harm. Then you may return, but whether you shall find your posts (or poles) again, I cannot say. (Probably marks of agricultural subdivisions.) After a short contest shall follow peace and quiet. The peace shall be announced at Christmas from all the pulpits."

Numberless traditions speak of the burning of the town of Unna, round which, and not through it, the armies will march, on account of the conflagration. Others speak of the burning of Dortmund, on the east side. Others, again, describe how the remains of the enemy fly to Erwitte and Salzkotten, and are there totally cut to pieces. All the towns and villages from Paderborn to the Rhine have similar traditions. There is a very old one concerning the Marienheide (a heath),—namely, that there the Whites shall drive the Blues before them, and through the Lippe, in which many shall be drowned.

Traditions concerning the years 1846–1850 :—

"1846, I would not be a vine."

"1847, I would not be an apple-tree."

"1848, I would not be a king."

"1849, I would not be a hare, a soldier, or a grave-digger."

"1850, I would not be a priest."

In 1846, the crop of grapes was too heavy for the vines.

In 1847, the apple-trees broke under the weight of their fruit.

In 1848, as we know, kings were at a discount.

In 1849, the hares suffered from the suspension or abolition of the game laws in Germany; the soldiers had much to suffer; and the grave-diggers, in consequence of war and cholera, were overwhelmed with work in many places.

As to the priests in 1850, we heard from several quarters, of an old prophecy that there should be a fearful massacre of priests, against whom the people shall be much embittered. One seer declares, that such will

be the hatred of the peasantry toward the priests, that a peasant, sitting down to dinner with his family, and having just stuck a fork into the fowl, shall, on seeing a priest pass by the house, lay down his fork, rush out, beat out the priest's brains with his club, and then return to his meal with satisfaction.

Another tradition, of which we heard from several well-informed persons, states that a pope shall come as a fugitive to reside at Cologne, with four cardinals, and there exercise his ecclesiastical functions.

A prophecy, of date 1622, concerning certain months of a year not named :—

"The month of May shall earnestly prepare for war. But it is not yet time. June shall also invite to war, but still it is not time. July will prove so cruel that many must part from wife and child. In August, men shall everywhere hear of war. September and October shall bring great bloodshed. Wonders shall be seen in November. At this time the child is twenty-eight years old (the powerful monarch), whose wet nurse shall be from the east. He shall do great things."

Prophecies of the "Powerful Monarch :"—

"One prophet says,—'He shall be of an ancient noble house, and descend from the top of the rocks. His mother shall be a twin. He will be Emperor of the Holy Roman Empire (the German Empire). Holzhauser says, 'He shall be born in the bosom of the Catholic Church;' his name shall be, 'The Help of God.'"

See the preceding prophecies, *passim*.

We have now given a sufficient sketch of some of the more curious and definite popular German prophecies. The curate of Dortmund adds a considerable number of others, more vague, mystical, and in some cases theological, which we omit, as not adapted to our present purpose; and others not bearing on Germany, of some interest—especially a long one concerning Italy by the Franciscan monk, Bartolomeo da Saluzzi—which want of space prevents us from discussing at this time.

Let us now consider the foregoing prophecies in general. We must admit, as it seems to us, that there exist in Germany unfulfilled popular prophecies, the authenticity of which is respectably attested and generally admitted.

We further observe, that taking the whole of them, as far as known to us, we can trace the following points pervading the entire series, more or less :—

1. A great war after a peace, about this time.

2. It is preceded by political convulsions, and lesser wars.

3. The East and North fight against the South and West.

4. The latter finally prevail, under a powerful prince, who unexpectedly rises up.

5. The great struggle is short, and occurs late in the year.

6. It is decided by the battle of the Birch-Tree, near Werl.

7. After horrible devastations, and murders, and burnings, caused by this war, peace and prosperity return.

8. Priests are massacred and become very rare; but

9. One religion unites all men.

10. All this takes place soon after the introduction of railways into Germany.

11. The present King of Prussia is the last.

12. The "powerful prince" from the South becomes Emperor of Germany.

13. France is, about this time, inwardly divided.

14. The Russians come as enemies to the Rhine, the French enter Germany as friends—without entering into further details.

We see moreover, that, admitting the genuineness of the prophecies, partial fulfillment has in several cases taken place. Here it must be noted, that our curate has chiefly confined himself to the unfulfilled parts, and has avowedly omitted many fulfilled predictions. While we attach considerable importance to the general impression among the people of the truth of these prophecies, which in part depends on their partial fulfillment in past times, our chief object has been to put on record the more remarkable of the unfulfilled predictions, in order that they may be compared with future events.

If we seek to form any idea of the origin of these prophecies, we find that there are three sources, from which the people may have derived the traditions.

1. They may possibly be, in some cases at least, derived from the reflections of sagacious men. Even Napoleon predicted dreadful wars, and that Europe must become either Cossack or Republican. But although some things may thus be explained, we do not see how the minute details in other cases can be thus accounted for.

2. Scriptural prophecies may have been applied to modern events, which, indeed, are no doubt foretold in them, in a general way.

We cannot avoid observing the tolerably frequent occurrence of Scripture language in the predictions; but this also does not account for all the details.

3. The seers or prophets may have had genuine visions, or dreams, in which they saw what they describe: it has been seen that various prophets use language implying this. And, while the general resemblance of the different visions naturally leads us to suspect that the popular traditions have a common origin; we can at most conclude from this, that the original seer or seers lived long ago, which only increases the difficulty. They were probably, like Brother Herrmann, monks and ascetics, their imaginations exalted by religious fervor: in other words, they were nervous and excitable, and predisposed to visions. Supposing their visions known to the people, the feeling of the marvellous, if excited along with religious sentiments, may have led to visions or second sight among the peasantry, and thus visions may have been multiplied and expanded in details.

If we reflect on the many known instances of prophetic dreams, and on the alleged and respectably attested cases of somnambulistic prevision, we shall see reason to hesitate before we deny the possibility of the occurrence, in certain individuals, of prophetic visions. We are far from imagining that, if such have been the case with our German seers, they have enjoyed direct communications from Heaven; on the contrary, were we satisfied of the fact, we should regard it as a phenomenon depending on some obscure physical cause, which may in time be discovered and traced; and which, at all events, exists by Divine permission.

Here we may allude to the remarkable prophecy of Monsieur de Cazotte, who, some years previous to 1787, predicted to a large company of persons of rank, science, and literature, with much detail, the atrocities of the Reign of Terror. He likewise told many of those present, both male and female, that they should perish on the guillotine. To Condorcet, he said that he should die in prison, of the effects of a poison which he should long, with the view of escaping a public execution, have carried about his person—which happened. He also predicted the fate of Louis XVI. and his Queen. This prophecy caused much amazement, and soon became known. Persons are yet alive, both in France and England, who heard it detailed before 1789. We have seen one of them. Now, it might be said, that Cazotte merely

exercised a rare sagacity, in judging of the course of events, at a time when all France was enthusiastically looking forward to the blessings of liberty, and while yet no one dreamed of violence or bloodshed. But this would hardly account for the details he gave. On the other hand, he often uttered predictions; and it is very remarkable, although it has been too much overlooked, that those who report his prophecies, including the above one, always state that, when about to predict, he fell into a peculiar state, *as if asleep*—yet not ordinary sleep. It can hardly be doubted that this was a trance, in which he saw visions. That they were fulfilled to the letter is surely, if only a coincidence, a most wonderful one. If, again, it was merely the result of sagacious reflection, how came it that Cazotte alone of all the able thinkers then in Paris, made these reflections, and was laughed at for his pains?

The laborious, minute, and conscientious researches of the Baron von Reichenbach have proved, beyond a doubt, that we are far from being acquainted with all the physical influences which surround us; and he has even referred to a physical cause—one source of the belief in ghosts—by proving that luminous appearances are visible, to sensitive persons, over recent graves. No one can fail to see the resemblance between the Sensitives of Baron von Reichenbach, who are far from rare, and the Spoikenker, or ghost seers, of the curate of Dortmund.

We consider it probable, therefore, that at different periods seers have had visions, more or less distinct and detailed, of what appeared to their minds likely to happen; that these visions have occurred in a state

of trance; that among ascetic monks, who may be regarded as liable to such trances, it may often have happened that extensive knowledge of history and of mankind has enabled them to foresee the probable course of events; that their predictions, becoming known to the peasantry, have given a tone to *their* visions, in which the events are generally localized in the immediate vicinity of the seer; and that thus, by degrees, more detailed predictions have arisen. Considering the general ignorance and superstition of the peasantry in all countries, it is not wonderful that such predictions generally bearing on violent political convulsions, war and religion, the subjects most interesting to their minds, should acquire a hold over them such as is found to exist in many parts of Germany, in reference to the prophecies above described. It is even probable that the existence of the predictions may have had a considerable influence in preparing the people for such sudden outbreaks as those of 1848, and may thus, in some measure, have contributed to their own fulfillment.

We must admit that these remarks do not much assist in explaining the occurrence of minute details in these predictions, many of which are said, on good authority, to have been fulfilled. But we do not feel ourselves in possession of sufficient evidence to justify us in arguing on the alleged fulfillment as certain; and we have therefore satisfied ourselves with laying before the reader a brief sketch of these predictions, the existence of which, as an article of belief with many thousands of people at this day, is, under whatever point of view it may be considered, very interesting. W. G.

From the North British Review.

HISTORY OF NEWSPAPERS.

The Fourth Estate: Contributions toward a History of Newspapers, and of the Liberty of the Press. By F. KNIGHT HUNT. 2 vols. 8vo. London, 1850.

THE FOURTH ESTATE! It is a taking title, and worth a bookseller's two hundred pounds any day, provided always that the writer who undertakes to elucidate and apply that mystic phrase shall studiously abstain from exciting the disgust of the popular reader by teaching him aught that he does not already know, or fancy he knows. New knowledge, if it be really new knowledge, and other than the statement of new facts, which are little more than the means of new knowledge, requires thought and the exercise of discernment, than which there is nothing more abhorrent to the popular reader, unless it be the call which is occasionally made upon him by some obscure writer or other for a revisal of his supposed knowledge; against such a proposition the popular reader utterly revolts, and pronounces the proposer of it to be a quack and a transcendentalist,—terms which he holds to be well yoked, if indeed they are not synonymous. Now Mr. Hunt, as we infer from the introductory chapter of his book, is a journalist, and, as such, must be fully aware of these curious truths in natural history; nor has he neglected to use his cognizance of them in the volumes before us. He has collected all the facts of English newspaper history which are required to constitute a good general acquaintance with the subject; he has shown tact in giving the greatest prominence to those which, whether justly or unjustly, have attained the greatest notoriety; he has not forgotten that the readers to whom he chiefly addresses himself will consider a fact or a remark witty or noteworthy in proportion to the number of times they have met with it before. But when he has ventured beyond the transcription of facts and into the region of principles, it has been with cautious exclusion of novelty and of hinted doubt of the infallibility of the commonplaces concerning the might and worth of the newspaper.

We shall deviate somewhat from this method, and before presenting our readers with a summary of the useful and entertaining contents of "The Fourth Estate," we beg to enter a few queries as to the validity of certain widely diffused notions concerning the press generally, and the newspaper press in particular.

If, in the course of these remarks, the true worth and moral power of the press shall seem to be less insisted upon than those qualities which appear to us to render it in some respects the most deleterious ingredient of modern civilization, our readers must remember that the praises of this engine have been repeatedly proclaimed to all men by the press itself, which seldom misses an opportunity of sounding its own trumpet. But before we proceed to take, for the nonce, the unpopular side of the question, let us hear what sort of affirmations are commonly made by the defendant's counsel, who are chargeable, as we believe, not so much with direct misstatement of facts, as with egregious special pleading. "The newspaper," says Sir Edward Bulwer Lytton, "is the chronicle of civilization, the common reservoir into which every stream pours its living waters," (an unpleasant idea is here suggested, but let it pass,) "and at which every man may come and drink. It is the newspaper which gives to liberty practical life, its perpetual vigilance, its unwearying activity; the newspaper is a daily and sleepless watchman, which reports to you every danger which menaces the institutions of your country, and its interests at home and abroad. The newspaper informs legislation of the public opinion, and it informs the people of the acts of legislature; thus keeping up that constant sympathy and good understanding between people and legislators which conduces to the maintenance of order, and prevents the stern necessity for revolution. The

newspaper is a law-book for the indolent, a sermon for the thoughtless, a library for the poor." Another famous English novelist declares that "Newspapers are a link in the great chain of miracles which prove the greatness of England." The English opium-eater, with more depth and definiteness of meaning, writes,—“Much already has been accomplished (by newspapers,) more than people are aware, so gradual and silent has been the advance. How voiceless is the growth of corn! Watch it night and day for a week, and you will never see it growing; but return after two months, and you will find it all whitening for the harvest. Such, and so imperceptible in the stages of their motion, are the victories of the press.” Very eloquent, though we hope a little hyperbolic, are the anticipations of M. Lamartine:—“Before this century shall have run out, journalism will be the whole press, the whole human thought. Since that prodigious multiplication art has given to speech, to be multiplied a thousand fold yet, mankind will write their book day by day, hour by hour, page by page. Thoughts will spread in the world with the rapidity of light—instantly conceived, instantly written, instantly understood at the extremities of the earth, it will speed from pole to pole. Sudden, instant, burning with the fervors of soul which made it burst forth, it will be the reign of the human word in all its plenitude, it will not have time to ripen, to accumulate into a book—the book will arrive too late; the only book possible from day to day is a newspaper.” May we be kept from a consummation so devoutly to be dreaded! Finally, and with as much eloquence as, and certainly with more reason than, most of the eulogists of the newspapers, Mr. Hunt writes:—

“The journal gives us day by day the experience of the world as it exists round about us, ready to avouch the truth of the journalist—gives us day by day and week by week the experience of the whole world’s doing for the guidance of each individual living man. It is a great mental camera, which throws a picture of the whole world upon a single sheet of paper. But though a great teacher and an all-powerful instrument of modern civilization, there is no affectation of greatness about it. The newspaper is the familiar of all men, of all degrees, of all occupations. If it teaches, it teaches imperceptibly. It has no pompous gown or scholastic rod to abash or to control, but prepares itself, and is admitted freely and at once, to a world-wide intimacy with all kinds and conditions of people. For the idle it is a friendly gossip; to the busy it shows what business is on hand; for the poli-

tician, it reflects the feelings of the party; for the holiday-maker, it talks about new plays, new music, and the last exhibition. Its ample page is full of the romance of real life equally with the facts of real life. The types that to-day tell how a king abdicated or a good man died, tell to-morrow the price of logwood or of tallow. As they stand side by side, those tall columns of words show us the hopes of the sanguine and the sufferings of the unfortunate; they hang out the lure of the trader who would sell his wares, and of the manager who would fill his theatre; shoulder by shoulder are the reports of regal and noble festivities and lists of bankrupts and insolvents; and in as many paragraphs we find linked the three great steps of a generation—the births, marriages, and deaths. No wonder, then, that whilst the world grows tired of orators and weary of the mimic stage, it should be more and more faithful in its reference to the intellectual familiar that drops, as De Tocqueville says, the same thought into ten thousand minds at the same minute; or more attached to the friendly broadsheet, that reflects truly and promptly the changing, but ever-exciting scenes of the great drama of real life.”

Mr. Hunt, we see, wisely rests the chief value of the journal upon its capacity as a chronicler of outward facts; it is in this capacity that we are at least inclined to quarrel with it. And yet the injury which has been done, and is now being done, to the immediate interests of society, by the avidity wherewith this chronicle, considered merely as a chronicle, is received; and the consequent distaste for sources of sound and permanently worthy information, is scarcely calculable. The newspaper is become “something to all men, and to some men all;” and the fact of the prodigious majority of those to whom it is all, is one which we may rather lament than question. Who can doubt that the present ominous oblivion, among the people, of truths which are the very alphabet whereby we read the mystesy of life, is chargeable, in connection with deficient means of public education, upon that “haste to be rich,” which shall not be without its guilt, whether the wealth be that of lucre or of idle knowledge? What are the characteristics of the newspaper reader, he to whom the newspaper is not only something, but all? Let the ungracious portraiture be executed with as little expense of our spleen as possible. “You must have observed,” says the Spectator, “that men who frequent coffee-houses and delight in news, are pleased with everything that is matter of fact, so it be what they have not heard before. A victory, a defeat, are equally agreeable to them. The shutting of a cardinal’s mouth pleases them at one post, the opening of it at another.

er. They are glad to hear that the French Court is removed to Marli, and are afterward delighted with its return to Versailles. They read the advertisements with the same curiosity as the articles of public news; and are as pleased to hear of a piebald horse that is strayed out of a field near Islington, as of a whole troop that have been slain in any foreign adventure. In short, they have a relish for everything that is news, let the matter of it be what it will; or, to speak more properly, they are men of a voracious appetite, but no taste." Had the writer lived in our day, when the characteristics of the class in question have been developed by an additional century of vigorous life, the sketch would have borne a more bitter air. Indeed, we find a far more serious estimate of the particular evil in point in a number of the *Freeholder*, at a time when the sources of the infection were as yet almost limited to the English metropolis. "There is scarce any man in England, of what denomination soever, that is not a free-thinker in politics, and hath not some particular notions of his own by which he distinguishes himself from the rest of the community. *Our island, which was formerly called a nation of saints, may now be called a nation of statesmen.* Almost every age, profession, and sex among us has its favorite set of ministers and scheme of government. Our children are initiated into factions before they know their right hand from their left. They no sooner begin to speak but Whig and Tory are the first words they learn. They are taught in their infancy to hate one-half of the nation; and contract all the virulence and passion of party before they come to the use of their reason. * * * Of all the ways and means by which this political humor hath been propagated among the people of Great Britain, I cannot single out any so prevalent or universal as the late constant application of the press to the publishing of state matters." Nor do we lack witnesses of a yet remoter date to prove that we are raising no new alarm. When Dr. John North, whose life we quote from, "was at Jesus College, coffee was not of such common use as afterward, and coffee-houses were but young. At that time, and long after, there was but one, kept by one Kirk. The trade of news also was scarcely set up; for they had only the public *Gazette*, till Kirk got a written *New-Letter*, circulated by one Muddiman. But now the case is much altered; for it is become a custom, after chapel, to repair to one or other of the coffee-houses, (for there are divers,)

where hours are spent in talking, and less profitable reading of newspapers, of which swarms are continually supplied from London. And the scholars are so greedy after news (which is none of their business), that they neglect all for it; and it is become very rare for any of them to go directly to his chamber after prayers, without doing his suit at the coffee-house, which is a vast loss of time." The strong and sober muse of Crabbe dedicated an entire poem to this most unpoetical of subjects, the Sunday paper occupying a conspicuous figure in his general censure—

"No changing season makes their number less,
Nor Sunday shines a Sabbath for the press!

Then lo! the sainted monitor is born,
Whose pious face some sacred texts adorn:
As artful sinners cloak the secret sin,
To veil with seeming grace the guile within;

So moral essays on his front appear,
But all his carnal business in the rear;
The fresh-coin'd lie, the secret whisper'd last,
And all the gleanings of the six days past.

With these retired, through half the Sabbath-day,
The London loungeer yawns his hours away.

* * * * *

To you all readers turn, and they can look
Pleased on a paper who abhor a book;
Those who ne'er deigned their Bible to peruse,
Would think it hard to be denied their news;
Sinners and saints, the wisest with the weak,
Here mingle tastes, and one amusement seek."

We should not have to search far in order to discover other censures as strong and as much to the purpose as these are; but these suffice to show that we are broaching no heresy in the foregoing and the following remarks.

Newspaper-reading in excess is so common a form of mental debauchery that sober people have almost forgotten to regard it as an evil. Let us beg the attention of such persons to an enumeration of a few of the most startling moral symptoms of the present day, and leave it for them to judge whether we are far wrong in attributing those symptoms mainly to the inevitably tremendous national influence (whether for immediate good or ill) of the newspaper press.

Into a man of an impatient stomach, we are divinely assured, that wisdom shall not enter. Is there any more widely apparent evil on the face of the existing generation than this of an impatient stomach?—a mental digestion that rejects all wholesome nutriment, and perpetually craves excitements

which do but hasten its utter destruction. Compared with the feverish glow which attends the continual indulgence of an impertinent curiosity, the gentler warmth accompanying the reception of noble knowledge seems frigidity itself. In Swedenborg's "Heaven and Hell" there is a curious and by no means uninteresting disquisition concerning the nature of the heat which is commonly conceived to pervade the latter. Here are a few words in which a sharp-sighted man may discover matter bearing significantly upon the present topic:—"It is to be observed that the above fire, or infernal heat, is turned into intense cold when heat from heaven flows in, and in this case the infernal inhabitants shiver like those who are seized with a cold fever, and they are likewise inwardly tormented; and the reason of this is, because they are altogether in opposition to the Divine principle; and the heat of heaven, which is Divine love, extinguishes the heat of hell, which is the love of self, and with it the fire of their life, whence comes such cold and consequent shivering, and likewise torment."

This popular lust for news, may it not safely be affirmed to constitute one of the mightiest elements of our national decay? What should so naturally accompany and succeed a national fever (for with us the newspaper is no less) than a proportioned national debility? Our greatest political danger lies where it is, by most of us, the least suspected—namely, in our self-induced weakness and apathy that, ere long, may be apt to seek the evil which now we profess chiefly to abhor. The powerlessness of governments, consequent upon the enervated state of those who ought to constitute the most worthy portion of the governed, confers upon ultra-democracy that false semblance of vigor which induces the most of us to worship material strength wherever we find it. Earnestness is not, as is commonly supposed, the thing that is now popularly admired. It is power, or the pretence and semblance of power, before which we at present bow down, utterly careless as to whether it be of the Devil or of God. We are, therefore, in a fair way to lose our freedom, not so much by a series of exhausting blazings-forth of Democracy, as, *miserabile dictu*, by a deliberate recurrence to despotism as a good thing.

Thanks, however, to the force of newspaper teaching mainly, the loss here contemplated would not be by any means so great as it might have been under happier

preceding circumstances. Our "liberties" are at present very vaguely defined affairs in the minds of the most of us; and in the minds of many who entertain ideas of some positiveness upon the subject it has become a question whether the particular liberties that are most talked about are any longer worth maintaining. Religious liberty with the majority, means liberty to be irreligious; and the common notion of civil liberty seems to be, that people shall be allowed to be as vile as they like, provided they do not interfere with the same privilege in others.

The prodigious spread of a very superficial knowledge, through the means chiefly of the newspaper press, has called into existence another class of phenomena, which, if they are less ominous than the foregoing, are considerably more absurd. We mean the spasmodic efforts which this generation has made, and is still actively engaged in making, to stand upon its own legs, and to be "original"—efforts which have led those who are or fancy themselves to be the "spirits of the age," into the queer notion that all "conventionalities," as such, are baseless, and to be abandoned as soon as possible;—whereas, on the contrary, there is a very strong probability in favor of any particular custom of manners, or habit of thought, that, upon examination of its forgotten grounds, it will be found to be just and necessary. What will the "spirits of the age" do, should "originality" itself become "conventional," as is likely enough if our young men "go ahead" much longer at their present rate?

Another evil, more deep than obvious, of the extent to which newspapers are read by the people, is the result upon them of the publication of religious controversies. We will not dwell upon the manifest injury inflicted upon national religion by the mere knowledge of the divisions by which it is afflicted—a scandal which of all others, perhaps, is the most fatal to the weak brethren: we will only direct attention to the habits of religious study which arise among seriously disposed, but not religiously educated persons. When they desire to make themselves acquainted with the elements of chemistry, mathematics, and the like, they do not begin with controversies on the nature of the ammoniacal combinations, or discussions of the relative merits of the fluxional methods of Newton and Leibnitz; they study accredited elementary text-books; but, chiefly, as we expect, by reason of the conceited infatuation of their minds by newspaper appeals to their judgment upon religious points that are

totally beyond their powers of judgment, they begin their theological course, not with the Bible and the simplest and most authoritative elucidations thereof, but with a plunge, quite at random, into *controversies* on baptismal regeneration, the doctrines of election and reprobation, the procession of the Holy Spirit, &c., making themselves thoroughly conversant with the denials of all Christian truths, before they have once read or considered any simple and fair statement of them.

It would be vain, however, here to attempt even an enumeration of the immediate evils, which are the price to be paid for the future and ultimate results of the newspaper press upon civilization. If we assert that almost all the peculiar evils of our latest civilization are, in part, chargeable upon that source, the reader will not hold us guilty of a paradoxical or exaggerated statement, when he calls to mind the fact, that the newspaper press has constituted by very much the most mighty of the powers engaged in giving form to that quite peculiar phase of civilization which has arisen entirely since the Revolution of 1649,—exactly the date of the first appearance of newspapers in such numbers as to constitute a recognizable element of our national life.

Far be it from us to question the excellence of the ultimate results intended by heaven in all great movements or events, but equally removed from our hearts be the folly of a large class of our modern optimists, who refuse to regard evil as evil, provided that future good shall come of it. It would not have much consoled a wise Roman, in the Empire's latter days, to consider that his once noble but then fast rotting State, might operate, in times to come, as manure, admirable for the nourishment of a world-wide crop of alien civilizations. Nor is the sorrow with which we contemplate the present and imminent evils, resulting, and about to result, from the prodigious and ungovernable power of a teacher, necessarily ignoring all knowledge besides that which will render its teaching popular, much diminished by the reflection, that the destruction thus operating at the core of our national life, may, nay must, further the advent of that last consummation, when it will be seen by all that the good which God extracts from evil does in no way relieve the guilt of evil-doers.

In justification of the foregoing remarks, we observed at the outset, that the laudations commonly bestowed by the newspaper press upon itself are less frequently false

than they are egregiously one-sided. There are, however, two or three widely circulated affirmations upon the subject which we beg to contradict flatly. Mr. Hunt repeats a common thought when he says, that the newspaper "is a mental camera, which throws a picture of the whole world upon a single sheet of paper." The newspaper is no such thing; the picture given by it may, in general terms, be affirmed to be a very partial and distorted, and, in most respects, false representation of that in the world which is least worth the representing. The wicked, the noisy, and the shallow, make the chief figures in it. The truest, the most energetic activities find no record. A good man might die of sheer despair if he were ignorant enough to believe that the newspaper fairly represented the world around him.

Another preposterous error is the supposition that the newspaper is by its nature an instructor. The newspaper may, by many accidents, become such to certain of its readers; but, by its nature, it is not their instructor, it is their representative. Each of these two offices we take to be wholly incompatible with the existence, in any primary sense, of the other.

The kind of discredit which applies to newspapers generally, from the fact of their being, for the most part, almost avowedly the organs of party, needs not to be urged by us. The style in which they are often managed, however, is a thing less commonly known and considered, though not less worthy of remark. A couple of amusing anecdotes of the prosperous days of the "Courier" may serve to relieve the gravity of these introductory considerations, and also to conclude them. The following is from a letter of Daniel Stuart, the proprietor:—

"At this time a struggle was going on, whether the Regent should be a Whig or a Tory, and important letters were passing between his Royal Highness and Mr. Percival. At midnight, George Spurrett, the porter, who slept in the Courier Office, was knocked up; a splendid carriage and splendid liveries at the door; a portly, elegant man, elegantly dressed, wrapped up in a cloak, presented himself, and inquired for Mr. Stuart; for, as I was abused in the newspapers as the conductor of the Courier, the merit of which belonged wholly to Mr. Street, I was the person inquired for by strangers. George said Mr. Stuart lived out of town; but Mr. Street, the editor, lived on the Adelphi Terrace. A packet was delivered to George, and he was enjoined to give it speedily to Mr. Street, as it was of great importance. This was a copy of the correspondence

between the Prince of Wales and Mr. Percival. To be sure of its being genuine, Mr. Street went immediately to Mr. Percival to inquire. On seeing it Mr. Percival started back, and exclaimed, 'This is done to ruin me with the Prince! If it appears in the *Courier* nothing will persuade him that I did not publish it as an appeal to the public against him! It must not be published!' 'No!' said Mr. Street, 'it is a very good article for the paper, and what will partner Stuart say if he hears of my suppressing it?' 'Well,' said Mr. Percival, who held it fast, 'some news shall be sent you as an equivalent.' Accordingly, an official dispatch of the taking of the island of Bandy, in the East Indies, was sent the same day, and was published in the *Courier* before it appeared in the *London Gazette*. I knew nothing of this till the evening, when I dined with Street at Kilburn, where we had a hearty laugh at these occurrences."

The "dodge" described in the following words of Mr. Hunt is a very amusing individual of a very common species:—

"A great feature of the *Courier* was its second editions. These, during those days of excitement, the public were never allowed to forget. Men with horns ran down the streets, making a 'most hideous music,' and shouting between each blast, 'News, news, great news, *Courier*—*Courier*, great news, great news—second edition.' Two or three strong-lunged fellows would at times be within hearing at once, and no one could avoid noticing the fact. The stock of papers each carried with him usually found a ready sale, and then the office was resorted to for more. A story has been told to show how these second editions were sometimes made. The editor must have a second edition, and news must be found to make it. The account of Bellingham's murderous act was, of course, a great card for the papers. Thousands upon thousands had been issued with all that could be got together, but the public appetite being satisfied the demand fell; when suddenly the town was disturbed by the horns, and voices, and the hurrying feet of the newsmen, who bellowed out, 'Third edition, third edition—*Courier*, *Courier*—Bellingham, Bellingham—late news, late news.' The papers were sold rapidly, and on went the successful hawkers to find new customers. As the third edition was greedily searched for the additional intelligence, each reader was gratified with the important paragraph—'We stop the press to announce, that the sanguinary villain, Bellingham, has refused to be shaved!'"

Let us now take a rapid glance at the principal events detailed in Mr. Hunt's "*Contributions toward a History of Newspapers and of the Liberty of the Press*."

When the reign of James the First was drawing to a close; when Ben Jonson was poet laureate, and the personal friends of Shakspeare were lamenting his then recent death; when Cromwell was trading as a

brewer at Huntingdon; when Milton was a youth of sixteen, trying his pen at Latin verse; and Hampden a quiet country gentleman in Buckinghamshire, the first English newspaper was published in London. Prior to this time many pamphlets and sheets headed by the word "*Newes*" had appeared, but they consisted generally of isolated accounts of some notable incidents, a great battle, the burning of a mansion, or the spread of an epidemic, and were irregularly issued; whereas "*The Weekly Newes*," as its name indicates, appeared at regular and stated intervals. Its projectors were Nathaniel Butter, Nicholas Bourne, Thomas Archer, Nathaniel Newberry, William Sheffard, Bartholomew Downes, and Edward Alde. Nathaniel Butter, however, seems to have been the principal author, the rest having been subordinate writers, or merely publishers. Butter claims the merit neither of striking originality of plan nor literary genius. All that he did was to produce a certain limited amount of connected and regular news, and to persevere boldly in his purpose. Commencing in 1622, his name is found in connection with newspapers as late as 1640.

Some years before the appearance of the "*Weekly Newes*," Butter had been a news-writer, or writer of news to private country gentlemen; for it was customary with such as could afford this luxury to have people in their employ to furnish them with intelligence from London. It at length occurred to Butter that he might extend his business, and make it more lucrative, by printing his sheets; and with this view he started his first paper on the 23d of May, 1622. Like most projectors, he gained little more than the honor of his invention, leaving the harvest of his profit to his successors. His paper was laughed at by wits, and ill supported by the public. From Ben Jonson's comedy of "*The Staple of News*," wherein the novel speculation is bitterly ridiculed, we probably discover the temper in which Butter's productions were generally regarded; and it would seem, from this and other sources of cotemporary information, that the father of journalists must have been endowed with no common resolution to continue his purpose in the face of the storm of railery, and in spite of the yet more distressing indifference by which his efforts continued to be acknowledged. The four places to which the Editor, in Ben Jonson's comedy, is supposed to send emissaries for the purpose of gathering news, are the Court, Old St. Paul's Cathedral,—where citizens are spoken of as

walking the aisles and discussing their own and other people's affairs,—the Exchange, and lastly, Westminster Hall; spots which would afford little profit to the news-seeker of the present day. We find, however, that at the period in question, the middle aisle of St. Paul's supplied, not only news, but a news-writer, who came forth from a band of "broken ancients, lieutenants," &c., who had served in the wars in the low countries, and now habitually met in the Cathedral to talk over their past exploits.

The first French newspaper appeared ten years after Butter's "Weekly Newes." It was published under the immediate patronage of Louis the Fourteenth, and under the direction of Theophrastus Renadaut, a medical man. Its title was "La Gazette de France." Some writers have tried to prove that other nations had established newspapers before either France or England, but it seems now to be a clearly established fact, that Nathaniel Butter was the true inventor of them. The names of papers referred to, as anterior to the "Weekly Newes," all prove to be those of irregular pamphlets, such as we have already described as existing in England previous to the year 1622. The Greeks and Romans may have had issues of this kind, and certainly had written public proclamations of recent events; but no regularly numbered and continuous paper can be produced to take from Butter the honor of his invention. Innumerable writers have been misled by Mr. Chalmers, who, in the *Life of Ruddiman*, enters upon the subject of journalism and the origin of newspapers. He states the first newspaper to have been "The English Mercurie," which was published in 1588, and thus ascribes "to the sagacity of Elizabeth and wisdom of Burleigh" the honor that is due to Butter. This error was first corrected by the learned bibliographer Mr. Watts, of the British Museum, who pointed out the comparative modernness of the paper and type of the "English Mercurie," and in other ways fully proved the supposed antiquity to be a glaring forgery.

The following extract from his "Letter to Antonio Panizzi, Esq., &c., of the British Museum," will interest our readers, not many of whom are likely to have seen that curious piece of bibliographical research.

"Mr. Nichols, who, in 1794, had transferred the substance of Mr. Chalmers' statement to the pages of the *Gentleman's Magazine*, afterward incorporated it, with an encomium on the sagacity of the discoverer, in the elaborate account of early

newspapers drawn up by himself, with the assistance of the Rev. Samuel Ayscough, and forming part of the fourth volume of his literary anecdotes. Mr. D'Israeli, who, in the early editions of his *Curiosities of Literature*, had given an article on the origin of newspapers, in which no allusion was made to the *English Mercury*, inserted an account of the alleged discovery, in subsequent editions, almost in the words of Chalmers. An independent account, not taken from the *Life of Ruddiman*, but evidently from a fresh examination of the *Mercury* itself, appeared in the 'Concise History of Ancient Institutions, &c., abridged and translated from Professor Beckmann, with various important additions,' published at London, in two volumes, in 1823. From these authorities, it is no wonder the information found its way into the *Encyclopædias* and other compilations of a similar nature. It is given in the *Encyclopædia Londinensis*, the *Metropolitana*, the new edition of the *Britannica*, and the *British Cyclopædia*, under the head of *Newspapers*. The '*Conversations Lexikon*' of Brockhaus, and the '*Neuestes Conversations Lexikon*' of Wigand, mention it in the article *Zeitung*; the '*Dictionnaire de la Conversation et de la Lecture*,' under the head *Gazetier*; the great Russian '*Entsiklopedicheskii Leksikon*,' under that of *Gazeta*. It appears in the '*Encyclopædia Americana*,' published at New York, and in the new edition of that work with alterations and improvements now publishing at Glasgow. In miscellaneous works on origins and inventions it has generally found a place. Even the circulation given to the statement by these channels is, however, inferior, in all probability, to that it has obtained by means of newspapers and miscellaneous periodicals, such as Hone's *Year-Book*, the *Saturday Magazine*, Chambers' *Edinburgh Journal*, &c., &c. For the last thirty or forty years it has formed a regular standard article of curious information, and by constant repetition, in and out of season, has been familiar to almost every desultory reader throughout the kingdom.

"There could hardly, in fact, be any circumstance in literary history apparently established on a firmer foundation than this. A statement originally made by a respectable authority, and repeated by so many others, was supported by reference to a document preserved, not in a private library or one difficult of access, but in the most public, the most easily accessible, the most universally frequented collection in the capital. Any doubt or suspicion that might arise could be confirmed or dispelled at once by applying for the volume, which was daily within call of hundreds of literary men, both English and Foreign.

"This document, on which for nearly half a century so important a statement has rested undisturbed and unchallenged, is, however, in reality, of so very questionable a character, that to see it was to suspect it, to examine it was to detect. On the 4th instant I was induced to refer to the '*English Mercurie*' by a consideration respecting it suggested in the article '*Armada*' in the *Penny Cyclopædia*. It is there pointed out, 'that as the Numbers of the *Mercury* in the Museum are marked as Nos. 50, 51, and 54, in

the corner of the margin, we are to conclude that such publications had occasionally been resorted to at critical times much anterior to the event of the Spanish Armada.' It struck me that the marginal numbers referred to might be merely added in manuscript in order to facilitate reference. On the book being brought, I had not examined it two minutes, before, to my surprise, I was forced to conclude that the whole was a forgery. I handed it to Mr. Jones, my colleague in the library at the Museum, and he immediately arrived at a similar conclusion. At that instant you, my dear Sir, came up, and I put the volume into your hands, with an inquiry whether you thought that the printing was executed in 1588. After a moment's examination, you unhesitatingly declared it impossible. I pointed out the other marks of authenticity that I had detected, your hasty inspection supplied still others, and the unaccountably successful imposition of fifty years was shattered to fragments in five minutes. Not a single individual of many who have since examined the 'English Mercurie' has imagined that the date of 1588 could be at all supported."

In 1740 an attempt was made to prove that the Romans (to whom printing was unknown) were the originators of newspapers, and in support of this proposition, extracts are given from the "*Acta diurna*," containing notices of public ceremonies, trials, births, deaths, &c.; but such records are to be found in the histories of every civilized people, and the "*Acta diurna*" were manifestly rather public proclamations of important occurrences, than newspapers. Venetian papers, written during the Turkish wars, and preserved in the library of Florence, have been also pointed out as newspapers of earlier date than the "*Weekly Newes*;" but these, like the "*Acta diurna*," were public proclamations, and were not circulated, but read to an audience, who paid a small coin, called "*gazetta*," for admission;—hence the word "*gazette*" as applied to newspapers.

The writers of the "*Weekly Newes*," who, in common with other authors, were under severe censorship, seem not to have dared to meddle with home affairs. They merely gave such foreign intelligence as reached them through travelers, or chance correspondence with other countries.

From the time of Gutenberg to that of the Reformation, the press was under the strict censorship of the Popes, who, from the beginning, laid claim to the same authority over printed books as they had formerly possessed over manuscripts. The Reformation was the cause of the first appearance of a more unshackled literature; for now each side put forth its arguments in spite of the

other, and men, being awakened to a hitherto unheard-of interest on the subject of Religion, read eagerly the controversial books and pamphlets that appeared; and these of course increased in proportion to the popular demand for them. For more than a century after the invention of printing, the books published were almost exclusively theological; but comparative liberty having been once gained, and a new want having been called into existence among the people, other books gradually appeared, and as the love of reading spread from the higher classes to the poor, and hitherto unlettered, many rose up from the latter to become in their turn teachers, and to extend the influence of the engine by which they had risen.

Attempts were, however, soon made to curb the liberty which the press had gained so rapidly during the progress of the Reformation.

In Elizabeth's reign, we find men in various walks of life, running great risks, and enduring heavy penalties, for the sake of the liberty of the press. The Star Chamber was called into play to stop this popular thirst for freedom of printed thought, and fines and imprisonment, with the pillory, the branding iron, and the hangman's fire in Smithfield, were employed at various times by Star Chamber authority, to torture writers, to terrify readers, and to cast odium upon unlicensed publications.

Attorney-General Popham, on the trial of Sir R. Knightley and others before the Star Chamber in 1588, referred to the fact, that "Her Majesty Queen Elizabeth, in her great wisdom, had issued proclamations that no pamphlets or treatises should be put in print but such as should be first seen and allowed; and further, lest that were not sufficient, she ordained that no printing should be used anywhere but in London, Oxford, or Cambridge. Notwithstanding, all this served not," continues this legal authority, "but they would print in corners, and spread abroad things unprinted; wherefore, Her Majesty set forth a proclamation in anno 25 (of her reign) that all Brownist books, and such other seditious books, should be suppressed and burned." Still the obnoxious publications appeared, and another proclamation was fulminated against "the new seditious and infamous libels spread abroad." That not sufficing, Sir Richard Knightley was selected for prosecution, as an example.

In spite of the efforts made by the Star Chamber to crush the liberty of the press,

its strength grew rapidly, and the relish of the people for free publications constantly increased with opposition. The Star Chamber continued to exercise a most tyrannical and barbarous power over the writers of all books, pamphlets, and newspapers, till the year 1641, when King Charles was importuned by his parliament, on occasion of an application for pecuniary aid, to abolish it altogether. The principal instigator of this request was Mr. Prynne, formerly a persecuted author, but now member for Newport. He had lost both his ears, and had undergone many other indignities, on account of his work against actors and acting, which, though it was proved to have been in the press before the Queen Henrietta had taken part in a masque at court, was considered to have been intended to throw discredit on Her Majesty for joining in such amusements. As soon as Prynne obtained political importance, he remembered his persecution, and gladly helped to put down a grievance under which he had suffered so severely. No sooner was the Star Chamber abolished, than the newspapers quitted their old reserve, and dealt freely in English news. The parliament itself published daily reports of its proceedings, under the name of "Diurnal Occurrences in Parliament." These were continued from 1641 till the Restoration, when Charles the Second immediately put a stop to a custom so incompatible with any form of despotism.

From 1640 till the Restoration, nearly 30,000 journals, pamphlets, and papers were published. The press seemed so to delight in its new freedom, that it could not produce fast enough to satisfy itself and its patrons. Mr. Thomasson, who lived during the Parliamentary Wars, collected all these publications. It is well known how Charles the First was to have purchased this collection, but was prevented by his death; that Charles the Second refused to carry out his father's intention; and that after passing through various hands, they were at last bought by George the Third, and presented to the British Museum, where they now are.

During the Civil Wars, each army is said to have carried printing apparatus in its baggage; and newspapers, under various names, generally *Mercuries*, were sent forth at every new event. The following are the titles belonging to some of the party papers of these times:—"Mercurius Fumigosus," "Mercurius Veridicus," "Mercurius Pragmaticus," "Mercurius Rusticus," "Mercurius Politicus," and "Mercurius Aulicus."

The Long Parliament had made strenuous but ineffectual efforts to check the rising power of the press, soon after its own published reports had shown the way to freedom. A committee of the House of Commons was appointed in February, 1640, to consider and examine all abuses of printing, licensing, importing, and suppressing books of all sorts; and in May of the following year, a committee was formed to consider the printing of speeches. The members of the Long Parliament had been somewhat freely spoken of; and though they were willing to publish their doings, they were ready to take alarm at the first sign of these reports being roughly handled. Sir Edward Dering was expelled from the House of Commons by a vote of that Assembly, for printing his own speeches. His publications were sentenced to be burned in Westminster, Smithfield, and Cheapside, by the common hangman; and Sir Edward was cited to appear at the bar of the Commons, where, kneeling, he received sentence of imprisonment in the tower. Several such instances occur; yet, from time to time, opinions were boldly uttered; and, upon the whole, the press was preparing itself gradually for the great emancipation which was awaiting it. In vain did the House of Commons thunder forth its orders "for preventing the printing and publishing of any scandalous or libelous pamphlets that might reflect upon the King or the kingdom, the Parliament, or Scotland; and for suppressing such as had already been printed;" or ordain, "that the book enjoining and tolerating sports on the Lord's day, should be forthwith burnt by the hands of the common hangman in Cheapside, and other usual places;" the controversial books still appeared, and increased in number; for each one that was crushed, many succeeded. And in the course of a month, another longer and more formal decree was published, in which the authorities complain of private printing-presses sending forth "false, forged, scandalous, libelous, seditious papers, pamphlets, and books," in such number that "no industry could be sufficient to discover and bring to punishment all the several abounding delinquents." The decree proceeds to give sundry rules for the licensing of speeches, books, pamphlets, &c. But the lawgivers alone were fettered by their law, and their adversaries continued their unlicensed war of words as before. John Milton now took up the defence of the liberty of the press; and it was by its last enactment that the Parliament brought upon

themselves this formidable adversary. In the *Areopagitica*, Milton exerted all his powers in advocating the side of liberty.

"Books," said he, "are not absolutely dead things, but do contain a progeny of life in them, to be as active as that soul was whose progeny they are; nay, they do preserve, as in a vial, the purest efficacy and extraction of that living intellect that bred them. I know they are as lively, and as vigorously productive as those fabulous dragon's teeth; and being sown up and down, may chance to bring up armed men. And yet, on the other hand, unless wariness be used, as good almost kill a man as kill a book. Who kills a man, kills a reasonable creature—God's image; but he who destroys a good book, destroys reason itself, kills the image of God, as it were, in the eye. Many a man lives a burden to the earth: but a good book is the precious life-blood of a master-spirit, embalmed and treasured up on purpose to a life beyond life. It is true, no age can restore a life, whereof, perhaps, there is no great loss; and revolutions of ages do not oft recover the loss of a rejected truth, for the want of which whole nations fare the worse. We should be wary, therefore, what persecutions we raise against the living labors of public men; how we spill that seasoned life of man, preserved and stored up in books, since we see a kind of homicide may be thus committed, sometimes a martyrdom; and if it extend to the whole impression, a kind of massacre, whereof the execution ends, not in the slaying of an elemental life, but strikes at the ethereal and fifth essence, the breath of reason itself; slays an immortality, rather than a life."

He afterward speaks of the impracticability of suppressing thought.

"If we think to regulate printing, thereby to rectify manners, we must regulate all recreations and pastimes, all that is delightful to man. No music must be heard, no song be set or sung, but what is grave and doric. There must be licensing dancers, that no motion or deportment be taught our youth, but what, by their allowance, shall be thought honest; for such Plato was provided of. It will ask more than the work of twenty licensers to examine all the lutes, the violins, and the guitars in every house; but they must not be suffered to prattle as they do, but be licensed what they may say. And who shall silence all the airs and madrigals that whisper softness in chambers? The windows also and the balconies must be thought on; these are shrewd books and dangerous frontispieces set to sale; who shall prohibit them—shall twenty licensers? The villages also must have their visitors to inquire what lectures the bagpipe and the rebec reads, even to the balladry and the gainut of every municipal fiddler; for these are the countryman's *Arcadias* and his *Monte Mayors*."

Milton then proceeds to point out the inefficacy of the attempts which have already

been made to check the publishing of unlicensed works; and a few pages afterward tells to the Parliament what he saw and thought in Italy.

"And lest some should persuade ye, Lords and Commons, that these arguments, and learned men's discouragement at this your order are mere flourishes, and not real, I could recount what I have seen and heard in other countries, where this kind of inquisition tyrannizes; when I have sat among their learned men (for that honor I had) and been counted happy to be born in a place of such philosophic freedom as England was, while themselves did nothing but bemoan the servile condition into which learning amongst them was brought; that this was it which had damped the glory of Italian wits—that nothing had been there written now these many years but flattery and fustian.

"There it was that I found Galileo, grown old, a prisoner to the Inquisition, for thinking in astronomy otherwise than the Franciscan and Dominican licensers thought. And though I knew that England was then groaning loudest under the prelatial yoke, nevertheless I took it as pledge of future happiness, that other nations were so persuaded of her liberty."

Almost immediately after this address of Milton to the Parliament, the whole nation was in arms, and the press was left in perfect liberty, while both parties were struggling for the mastery. General Fairfax, on his arrival with his army in London, made an attempt to bring the press into its ancient trammels. He applied to the parliament for assistance in this undertaking. Mr. Mabbot at his request was appointed licenser, and a committee was ordered to sit every day, with a large sum of money at its disposal, for the reward of those who should bring about convictions.

All these measures were of small avail; and the press continued to enjoy practical, if not nominal freedom, during the Protectorate.

Upon the accession of Charles the Second, the liberty of the press was again thrown back. The king resented the first free discussion of public affairs, by putting down the "*Mercurius Politicus*," and appointing two persons, named Muddiman and Gibbs, to publish news every Monday and Thursday. It was soon afterward forbidden to publish the proceedings of the parliament; and a law was passed placing all publications under the censorship of a licenser. Another law arranged all subjects for discussion under various heads, and appointed a licenser to superintend each. The Archbishop of Canterbury and Bishop of London superintended all works of theology; the Lord Chancellor, all

legal books; the Secretary of State, histories and political writings, &c. Printing-presses were allowed to be established only at London, York, and the seats of the two universities: other presses were ordered to be seized; and unlawful writers were made amenable to a court over which the Archbishop of Canterbury and the Bishop of London presided.

Political writings thus shackled, gave place, in great measure, to licentious poetry; and all purity seemed to be, for a time, forgotten. It was, however, still found necessary to supply the people with newspapers, and Roger L'Estrange, a fine scholar, who had long been devoted to the Royal cause, was appointed licenser and journalist. L'Estrange had suffered much during the Protectorate, having languished for four years in prison in constant dread of death, and was in a state of great poverty when Charles rewarded his services by appointing him to the conduct of the newspaper. L'Estrange showed himself quite equal to his post, and conducted his Paper, which he called "The Intelligencer," in a manner that raised the whole style and character of these publications. The first number of "The Intelligencer" appeared on the 1st of August, 1663. It was continued till January the 9th, 1665, when L'Estrange laid it down to commence the "London Gazette," which still exists as the vehicle of the bankrupt lists and official reports. The first number was printed in the following September. In 1679, L'Estrange set up another paper, called the "Observer," which he continued for eight years. His biographer does not give us the names of all the other papers in which he wrote, though he seems to have been a busy author for several years after the discontinuance of the Observer. He was knighted in James the Second's reign, and died, at the age of 87, in 1704.

During the censorship of L'Estrange, occurred the famous trial of Twyn. Mr. Hunt gives us the following account of it:—

"On an October night in 1663, the licenser L'Estrange, having received secret information, set out on a search for illegal publications. He had with him a party of assistants, which included four persons, named Dickinson, Mabb, Wickham, and Storey. These men were called up after midnight, and made their way, by L'Estrange's directions, to Cloth Fair. This had been Milton's hiding-place when he had 'fallen on evil days,' and here now lived another heterodox thinker—a printer, named John Twyn, whose press had been betrayed to the authorities

as one whence illegal thoughts were spread. When called on afterward to give evidence as to what had happened, Wickham described how he had met Mr. L'Estrange near Twyn's house, and how 'they knocked at least half an hour before they got in,' and how they listened and 'heard some papers tumbling down, and heard a rattling above before they went up.' The door being opened by its unfortunate owner, Wickham was posted at the back door, whilst another stood in the front, and the rest of the searchers went over the premises. Efforts had been made to destroy the offending sheets; the type had been broken up, and a portion of the publications had been thrown into the next house. Enough, however, was found to support a charge. Twyn's apprentice was put into the witness-box to give evidence against his master, and the judges were ready to coincide with Mr. Sergeant Morton, who appeared for the Crown, and declared Twyn's offence to be treason. The obnoxious book repeated the arguments often urged during the Commonwealth, 'that the execution of judgment and justice is as well the people's as the magistrate's duty; and if the magistrates pervert judgment, the people are bound by the law of God to execute judgment without them, and upon them.' In his defence Twyn said, that he had certainly printed the sheets; he 'thought it was mettlesome stuff, but knew no hurt in it;' that the copy had been brought to him by one Calvert's maid-servant, and that he had got forty shillings by printing it. He pleaded, moreover, in excuse, that he was poor, and had a family dependent on his labor for their bread. Such replies were vain, and the jury found him guilty.

"'I humbly beg mercy,' cried Twyn, when this terrible word was pronounced, 'I humbly beg mercy; I am a poor man, and have three small children; I never read a word of it.'

"'I'll tell you what you shall do,' replied the Chief-Justice Hyde, to whom this plea for clemency was addressed, 'ask mercy of them that can give it, that is, of God and the king.'

"'I humbly beseech you to intercede with his majesty for mercy,' piteously exclaimed the condemned printer.

"'Tie him up, executioner,' was the only reply: and Hyde proceeded to pronounce sentence. To read this sentence in the record of the trial makes the blood run cold. 'I speak it from my soul,' said the sycophant Chief-Justice, 'I think we have the greatest happiness in the world in enjoying what we do, under a good and gracious king. Yet you, Twyn, in the rancour of your heart, thus to abuse him, deserve no mercy!' After some further expressions of loyalty, and a declaration that it was high time an example should be made to deter those who would avow killing of kings, he ordered that Twyn should be drawn upon a hurdle to the place of execution; that he be hanged by the neck, and, being alive, that he should be cut down, and that his body should be mutilated in a way which decency now forbids the very mention of; that his entrails should afterward be taken out—and you still living, the same to be burnt before your eyes; your head to be cut off, and your head

and quarters to be disposed of at the pleasure of the king's majesty."

"I humbly beseech your Lordship," again cried Twyn, in his agony, "to remember my condition, and to intercede for me."

"I would not intercede," replied the judge, "for my own father, in this case, were he alive;" and the unhappy printer was led back to Newgate, only to leave it for Tyburn, where the sentence was soon afterward carried into effect. His head and the quarters of his body being set up to fester and rot on Ludgate, Aldersgate, and the other gates of the city.

Other printers were tried, but escaped with lighter punishments than the unfortunate Twyn. Among these were Simon Dover, Thomas Brewster, and Nathan Brooks, who were indicted at the Old Bailey, for printing the speeches and prayers of some of those who had promoted the late King's death. These publications had appeared in separate pamphlets. No newspaper now dared to admit such matters.

James the Second, like his brother, was strongly opposed to the existence of a free press. During his short reign, he enacted a law to entammel it; but what he effected among his own subjects, was overturned by the Dutch, who sent (chiefly from the Hague) innumerable pamphlets, in which English politics were freely discussed.

The Revolution again removed the censorship from the press, when it was a second time called upon by contending parties, to support their opposite opinions. The Government set up the "Orange Intelligencer," and the opposition was not long behind in establishing its rival journals; both sides wrote with unrestrained freedom. Some attempts were made to renew the Licensing Act, which was even put in force for six or seven years, but it was little regarded, and soon quite forgotten.

From 1661 to 1668, seventy different journals had appeared, some of long, and some of short duration. Before 1672, twenty-seven newspapers were added to the list. The Post Office, which had been established by Charles the First, and improved by William the Third, afforded increased facilities for the circulation of newspapers. The following advertisement in the "Flying Post" (1695), shows us that the old news-letters were not yet out of use:—"If any gentleman has a mind to oblige his country friends or correspondents with this account of public affairs, he can have it for twopence, of J. Salisbury, at the Rising Sun in Cornhill, on a sheet of fine paper, half of which being left blank, he may thereon write his own affairs,

or the material news of the day." We find another indication of the continued use of news-letters, in the case of a journal published by Ichabod Dawks, in 1696; it is printed on letter paper, and in imitation of an ordinary hand-writing—a portion of the paper being left blank, to be filled up by the purchaser.

Queen Anne's reign is remarkable in the history of the press, for having produced the first daily paper, the law of copyright, the imposition of stamps on newspapers, and duties on advertisements; all indications of a great change in the condition and importance of the newspaper press, since the time of Nathaniel Butter.

In 1704, we meet with another case of prosecution of a newspaper editor. The "Observator," from the 8th to the 11th of December, 1703, was declared to contain "matters scandalous and malicious, reflecting on the proceedings of the House, tending to the promotion of sedition in the kingdom." Bragg the printer, Tutchin the author, and How the publisher, were ordered to be taken into custody by the Sergeant-at-Arms. Tutchin, however, absconded, and continued to publish remarks upon the Parliamentary speeches. The Commons, therefore, applied to the Queen, praying her to issue a proclamation for his apprehension. He was apprehended, and tried; but, contriving to get off, he was soon after waylaid, and beaten so cruelly that he died of his wounds.

In 1709, the Daily Courant, the first morning paper, appeared. At this time there were eighteen other papers published in London; and as the Evening Post of September 1709 remonstrates, that "at least £400 per annum are being paid for written news, while the Evening Post may be had for much less," it is evident that news-letters were still much in use.

It was at this period that the journals, for the first time, combined news with discussion. The earlier papers contained news only.

In the eleventh year of Queen Anne's reign, the Sergeant-at-Arms was directed to take into custody Mr. Samuel Buckley, writer and printer of the "Daily Courant." He had published a memorial of the States-General, which was considered by the Parliament to contain "scandalous reflections upon the resolutions of the House." This seems to have been the result of a recommendation of the Queen to the Parliament, to chastise those who published "false and scandalous libels, such as are a reproach to any Government:"—a recommendation which led the way to a proposal for laying duties

on all newspapers and pamphlets. A duty was shortly after imposed, to the amount of a half-penny on every printed half-sheet, or less; a penny on a whole sheet; and twelve pence on each advertisement. The consequence of this tax was the immediate stopping of many minor papers, and the amalgamation of some of the survivors. The *Spectator* raised its price, and shortly afterward stopped. "All Grubb Street," writes Swift to Stella, "is ruined by the Stamp Act."

About this time, Steele lost his seat in Parliament, for the sake of which he had resigned a lucrative post, on account of certain anti-ministerial papers in the "*Englishman*" and the "*Crisis*;" and John Matthews, a boy of nineteen, was tried at the Old Bailey for publishing a Whig paper on hereditary right. He was condemned, and hanged at Tyburn.

During the age of Swift and Steele, newspapers made a rapid stride toward the prominent position they now occupy. Writers of acknowledged genius wrote in them. Swift and Dr. Sheridan started the "*Intelligencer*" in 1728; and the newspapers exercised so great an influence upon the minds of the people, that the legal authorities interposed more frequently than ever, though commonly without effect.

In the twelfth year of George the First's reign, a law was passed for the better regulation of the Stamp Act. The publishers of newspapers had evaded the old law, by printing on sheets between the penny and halfpenny sizes, and by this means had entered them as pamphlets, for which it was necessary only to pay three shillings on each edition. The new law prevented this evasion without increasing the duty.

In the reign of George the Second, unstamped papers were again sold, and to such an amount, that a reward of twenty shillings was offered to any one who would seize and bring to justice a vender of them. The clause tells us, that they were "daily sold, hawked, and carried about, uttered, and exposed to sale, by divers obscure persons, who had no known or settled habitation."

We have reports of the proceedings of the Parliament, in Boyer's Register, for several years after the accession of George the First. Notwithstanding the resolution of the House of Commons in 1729, "that it is an indignity to, and a breach of the privilege of the House, for any person to presume to give in written or printed newspapers, any account or minutes of the debates, or other proceedings of the House,

or of any Committee thereof;" and that upon the discovery of the author of such offence, the House will proceed against him with the utmost severity. Notices similar to those of Boyer were given in the *Gentleman's Magazine*. In 1740, Dr. Johnson became the writer of these notices, and continued to hold the post till 1743, when Dr. Hawksworth succeeded him. Dr. Guthrie had been Johnson's predecessor.

In 1745, Fielding, who had already published his first novel, started "*The True Patriot*." This paper continued only a few months; but its merit was such as to gain for its author the post of Bow Street Magistrate. Fielding afterward started some other papers. The "*Covent Garden Journal*" and the "*Jacobite*" contained articles by him.

From Bubb Dodington's Diary we find that at about this time, Lord Bute, then Minister, called on Dodington, and "had much talk about setting up a Paper." This project was carried into effect. Smollett was made editor of the new Paper, which was called the "*Briton*." An opponent soon started up, called the "*North Briton*," which had for its editor Wilkes, and for its chief supporters Lord Temple and the poet Churchill. The two editors, who, till now, had been personal friends, attacked each other with the greatest rancor. Wilkes at last gained the victory, and Smollett gave up the contest in 1763. The victorious Paper soon after put an end to its own existence by its boldness, in declaring that "falsehood had been uttered in a royal speech;" an assertion which caused its immediate downfall, and the prosecution of all engaged in it. The offending number was burnt by the common hangman in Cheapside.

In 1764, Mr. Meeres was fined £100, for mentioning the name of Lord Hereford in the "*London Evening Post*;" and for several years after this, we find that the same fine was occasionally imposed for a similar offence.

The letters of Junius (the first of which appeared in the "*Public Advertiser*," April 28th, 1767) caused several trials. In 1770, Almon, a bookseller, was fined for selling a copy of Junius' letter to the King, in a work called "*The London Museum*." Three other booksellers were tried for the same offence, and were acquitted, one of them, H. S. Woodfall, being found guilty of "printing and publishing" only.

In 1771, a long dispute commenced between the parliament and the people, concerning the printing of parliamentary debates. Since the time of Cromwell, there had been

no authorized reports of the proceedings of the House, though the people had had frequent intelligence of them through the journals and papers. The contest began by its being moved in the House that Thomson and Whebbe, two printers of these unlawful reports, should be called to the bar for infringing a standing order of the House. The offenders paid no attention to the summons left at their houses; orders for their arrest were then forwarded to the Sergeant-at-arms. This functionary reported that not only was his search for the two printers unavailing, but he was ridiculed and insulted by the servants of the offenders. An address for a royal proclamation was then voted against the delinquents, and a reward offered for their apprehension. These steps produced many debates in the House between the advocates for secrecy of speech and the supporters of the liberty of the press. The latter urged the impossibility of effectually suppressing free publication; and the appearance of six new offenders gave weight to their arguments. They urged, that as the members whose speeches had been published had not made any formal complaint to the Parliament in general, the House was not called upon to take the matter up; and that the ever-increasing number of offenders would keep them so constantly employed, that all matters of real import must be cast aside, if they proposed to carry out this "ridiculous contest with printers." The party who were for continuing the prosecutions prevailed: Whebbe and Thomson, the two original offenders, were apprehended and tried; but were discharged upon giving bail for their appearance at the ensuing session. The struggle, on its renewal, involved the House of Commons in the most perplexing difficulties, which were only to be solved by allowing the matter to drop as silently as possible. The Lord Mayor, who had been imprisoned in the tower for refusing to deliver up the offenders, was released by the dissolution of the Parliament which kept him there. Here the matter was permitted to end; and the debates have been printed from that day to this.

The excitement caused by this important contest greatly extended the sale of the papers concerned; and, as had been predicted by the opposition party, helped to raise the Press in the estimation of the people, who now began to regard it as the bulwark of national liberty.

In January, 1788, (just one hundred years after the appearance of the "Orange Intel-

ligencer,") the first number of the "Times" was published.

Prosecutions for libel, which constitute the main feature of the history of the progress of the freedom of the Press in England, were numerous and interesting after this date; but the most conspicuous of them—as those of Peltier, Cobbett, Leigh Hunt, &c.—have scarcely ceased to be among the topics of the time. Mr. Hunt describes them all at a somewhat unnecessary length. We hasten over this portion of his work, in order to present our readers with his very interesting and quite novel information concerning the working and expenses of a London Morning Paper in the present day. We give a rather full abstract of this part of Mr. Hunt's book.

It may be well to premise that the following account of the staff and weekly expenditure of a daily newspaper probably applies less accurately to the "Times" than to any other of the London morning journals, the expenses of that Paper being, we fancy, far greater than those exhibited by Mr. Hunt, who, unless we are mistaken, holds a high position in the editorial department of one of the other morning issues.

Staff and Weekly Expenses of a London Morning Paper in 1850.

Editorial.—Chief editor, 18 guineas; sub-editor, 12 guineas; second sub-editor, 10 guineas; foreign sub-editor, 8 guineas; writers (about 4 guineas a day,) £25; sixteen parliamentary reporters (one at 7 guineas and the others at 5 guineas per week.) £87, 7s.

Foreign.—Paris correspondent, 10 guineas; Paris reporter for chamber, &c., 3 guineas; expenses of office, subscription to papers, &c., 5 guineas. The Paris postage is also a considerable expense. Boulogne (agent), 1 guinea; Madrid, 4 guineas; Rome, 4 guineas; Naples or Turin, 3 guineas; Vienna, 3 guineas; Berlin, 5 guineas; Lisbon, 3 guineas. There are also correspondents at Malta, Alexandria, Athens, Constantinople, Hamburg, Bombay, China, Singapore, New York, Boston, Halifax, Montreal, Jamaica, and at other places, when there happens to be pressing news. All these are remunerated in proportion to the importance of their posts.

The next list is of the ports at which correspondents are engaged to facilitate the transmission of late news to London and the provinces, requiring regular reporters:—Dover, Southampton, Liverpool, Manchester, Leeds, Birmingham, Bristol, Dublin, Plymouth, Pembroke, Falmouth, Portsmouth, York, Wakefield, Chatham, Sheerness, Woolwich, Gravesend, Glasgow, Cambridge, Oxford.

Legal Reports.—Judicial Committee of Privy Council; House of Lords (judicial,) the cost of these two varies; Lord Chancellor's Court, three

Vice-Chancellors' Courts, Rolls Court, Court of Queen's Bench, Court of Common Pleas, Court of the Exchequer, Exchequer Chambers,—each 3 guineas. (Extra reporters are often required for these Courts.) Bail Court, Court of Bankruptcy, each 2 guineas; Insolvent Debtors' Court, 1 guinea; Central Criminal Court (the old and three new Courts,) 3 guineas; Surrey Sessions, Middlesex Sessions, and Sheriffs' Court, 1 guinea.

Circuits.—Home, Western, Midland, Oxford, Northern, Norfolk, Welsh; these cost from £20 to £30 a circuit, we may calculate them at £6 a week. The salaries of the law reporters are usually stopped during the long vacation.

Separate reporters attend the following Police Courts:—

Police.—Bow Street, Clerkenwell, Marylebone, Worship Street, Thames, Marlborough Street, Guildhall, Mansion House, Wandsworth, Lambeth, Southwark, Greenwich, Woolwich, Ilford Petty Sessions. Some of these reporters have stated salaries, others are paid according to the amount of their "copy" used by the paper. The whole amount is about £10 a week; upon general "penny-a-liners" copy about £10 more is expended.

Next come the arrangements for the city contributions, with their costs:—

City.—Money article, 7 guineas; Mark-Lane and Mincing-Lane markets, each 1 guinea. Smaller salaries are also paid to reporters of

Markets.—Smithfield, hay; Smithfield, cattle; Leadenhall, hides; Newgate and Leadenhall, meat; Billingsgate, fish; Southwark, hops; Thames Street, coals.

For city use, it is necessary to subscribe to the Stock Exchange lists, to Lloyds, and to the Jerusalem Coffee-house.

News of the Court, the Fine Arts, and the Turf, are supplied by the Court Circular, the sporting reporter, theatrical and musical reporter, and the fine arts' reporter.

It is usual to have in the establishment a man with a thorough knowledge of medicine and the collateral sciences, that the paper may not contain mistakes in reports of medical evidence, and legal investigations, where physiological, chemical or botanical science is concerned.

Some Public Meetings, Parliamentary Committees, Masters in Chancery, Railways, and other similar sources of news, are often attended by members of the parliamentary staff, others have their own reporters, and any extra work is given to the "penny-a-liners."

It is desirable, in addition to these paid sources of information, to have friends who will communicate intelligence from the public offices in Downing-street (where deputations have to be reported;) at the Horse Guards, for military news and rumors; at the Admiralty, the Treasury, and Board of Trade.

News must also be gathered from the Clubs, especially the Reform and Carlton Clubs.

It is requisite, also, to subscribe for Hansard's Debates, Acts of Parliament, Votes of the House, and other parliamentary papers, the London Gazette, the Coal-market List, and Packet List

A large number of foreign, colonial, and provincial papers are taken in: the average number of these may be put down at 150 daily. Sometimes these are paid for, but more frequently an exchange is entered upon. The examination of these newspapers is one of the most laborious duties of the sub-editors.

A great expense is entailed by the transportation of the different correspondents to the scenes of action, whence news is to be gathered. The transmission of their communications is also a very heavy item. Parcels are frequently sent by railway, when the post is not sufficiently expeditious. Occasionally, a heavy expense is incurred for a special railway engine. The electric telegraph is also a serious expense. The cost of ordinary railway parcels and portorage, averages from £5 to £7 a week. When a special engine is employed, any person may travel in it who chooses to share the cost; hence different papers frequently join in paying for the engine where it is necessary for the several correspondents to take news to London from the same spot. The expense of bringing up a report from Manchester to London is £50. The office in town is another expensive item. Here are to be accommodated in addition the editors and reporters.

A printer; assistant printer; maker-up of advertisements; three readers; three-assistant readers, or "reading-boys;" about forty-five or fifty compositors; also from eight to ten "grass" men, not regularly employed, but waiting for occasional work from the deficiency or absence of regular hands. These men, or "grass," are not recognized by the printer in his official capacity; a regular hand always being supposed to be at his *frame*, either in person or by his representative "grass."

The wages of the printer vary from £5 to £7 a week; the assistant printer and advertisement man, each from £3 10s. to £4; reader, £3; assistant reader, £1 to £1 10s.; the compositors, from £2 10s. to £3. Five or six men are generally employed by the printer after composition is closed, to assist in putting the paper to press; their wages being from £3 10s. to £4.

In the machine-room are engaged the machinist and assistant-machinist; chief and assistant engineer; sixteen men and boys feed the machine and take out the papers; one "wetter-down" prepares the paper.

The publisher has five guineas a week; there are also an assistant publisher, and four or five errand boys. Besides these there are the secretary, cashier, and accountant; three advertisement clerks, night porter, day porter, and errand boy.

There are also rent, gas, wear and tear of materials, and interest on outlay; these, with the other general weekly expenses, may be computed at

Editing, writing, and reporting a double daily paper during the session of Parliament, . . .	£220
Foreign and local correspondence, . . .	100
Printing, machining, publishing, and general expenses of double paper, with occasional second and third editions, and an evening edition three days a week, . . .	200

Weekly total, £520

The yearly charges of an established daily paper cannot, therefore, be estimated at less than £25,000.

The enormous cost of the paper and stamps have not been considered in this account, as it depends entirely on the number of copies printed.

The overland mail is a costly impediment to a newspaper, unless it be allowed to share the expense with others. It amounts to about £4,000 a year, that is, £20 a week each, when divided between four papers.

The Times had an action brought against it by one of its couriers, who complained of having been unjustly dismissed; and in one of the preliminary stages of the cause, it was made known that the Times had agreed to pay this man £100 a year as a fixed salary; £60 for every journey he should make in sixty hours from Marseilles to Paris; £14 for going from Paris to Boulogne in fourteen hours and a half; and £16 for going from Calais to Paris in sixteen hours and three quarters; with an additional allowance of £2 for every hour which he should be able to save in the specified time. All these disbursements being only a small portion of the total cost, to obtain a summary of the Indian news a few hours in advance of the regular mail.

The following account of the arrival of a mail-packet at Southampton, and of the transference of its news to the columns of

the London Paper, is an appropriate pendant to the foregoing notice of newspaper expenses:—

"We have now nearly 150 steamers, most of them of the greatest power and speed, engaged specially in bringing political and commercial intelligence from all parts of the world. They are never delayed at any port at which they may touch, but for the purpose of coaling, and landing and embarking mails; and their rapid and punctual arrival in this country, after, in some instances, running a distance of 3,000 miles without stopping, is one of the wonders of this remarkable age."

When a mail-packet is due at Southampton, watchmen are employed day and night to look out for her. In the day-time, when the weather is clear, and there is not much wind stirring, the smoke of a large mail-packet in the Solent may be seen from the quay by looking over Cadlands; but homeward-bound steamers are generally made out by means of powerful telescopes, after they have passed Eaglehurst Castle, by looking over the flat tongue of land which terminates where Calshot Castle stands. When she rounds Calshot Castle, a rocket is thrown up from her, which is a mail-packet signal. As soon as the rocket is observed, the watchmen are in motion running in different directions up the town. In a few minutes may be seen stealthily gliding toward the quay a few persons who, if it be a winter night, would scarcely be recognizable, disguised as they appear to be in great-coats, comforters, and every kind of water-proof covering for the head, feet, and body. These persons are the outpost newspaper agents. They make for the head of the quay, and each jumps into a small yacht, which instantly darts from the shore.

Cold, dark, and cheerless as it may be, the excitement on board the yachts is very great in calculating which will reach the steamer first, and at no regatta is there more nautical science displayed, or the contention more keen or earnest.

Let us suppose the time to be about six o'clock in the morning of a dark winter day. The yachts reaching the steamer just as "Ease her" has been hoarsely bawled by the pilot off Netley Abbey. As soon as pratique has been granted, the newspaper agents climb up the sides of the steamer oftentimes by a single rope, and at the risk of their lives, and jump on board. A bundle of foreign journals is handed to each of them, and they immediately return to their yachts and make for the shore.

They arrive at the Telegraph Office, and to write down their message is the work of a few minutes only.

The rule in writing down telegraphic messages is truly Benthamic, viz., to convey the greatest quantity of news in the fewest possible words. Perhaps the message is as follows:—"Great Western, — Jamaica 2d. Cruz 26. — Million dollars. Dividends 50 thousand. Mosquito war ended. Antilles healthy. Havannah hurricane. Hundred ships lost. Crops good. Jamaica rains. Sea covered. Wreck plantations." While the agents are writing these messages, the telegraph is at work, and by the time the messages are written at Southampton, they have been almost communicated to Louthbury. A cab conveys written copies of them with the utmost dispatch to the newspaper offices. They are immediately in the hands of the foreign editors, or sub-editors, who comprehend the purport of them immediately. In a few minutes they have been elaborated and made intelligible, and they shortly appear in a conspicuous part of the morning papers in the following shape:—

"Arrival of the West India and Mexican Mail. Important news from the West Indies. Dreadful Hurricane at Havannah. Awful Destruction of Property in Jamaica.

"The Royal Mail Steam Packet Company's steamer, Great Western, has arrived at Southampton. She brings news from Jamaica up to the 2d instant, and from Santa Cruz up to the 26th ult. She has on board freight to the amount of 1,000,000 of dollars on merchants' account, and 50,000 dollars on account of Mexican dividends. The miserable 'little war' unfortunately entered into by this country on behalf of the black King of Mosquito, has terminated. We regret to learn

that a most destructive hurricane has happened at Havannah, and that 100 ships have been wrecked in consequence. The weather, we are happy to say, has been fine in the West Indies, and the Islands are healthy. The crops of West India produce are progressing favorably. The May rains at Jamaica have been very heavy, and have done considerable damage. The rivers have swollen enormously, overflowed their banks, and done great damage to the plantations. The sea, at the mouths of the rivers, was covered with the wrecks of the plantations."

While, in conclusion, we thank Mr. Hunt for much useful information concerning the working of a modern newspaper, which none but a newspaper editor could supply, we must express our regret that he has not been able to devote more time and research than he has done, to the exhaustion and elaboration of his momentous theme. The excuse, however, which is implied in the following words, is a valid one; and the general fact which they assert, bears with unmistakable force upon the subjects of the remarks which preface this notice:—

"The man who once becomes a journalist must almost bid farewell to mental rest or mental leisure. If he fulfills his duties truthfully, his attention must be ever awake to what is passing in the world, and his whole mind must be devoted to the instant examination, and discussion, and record, of current events. He has little time for literary idleness, with such literary labor on his shoulders. He has no days to spend on catalogues, or in dreamy, discursive, researches in public libraries. He has no months to devote to the exhaustion of any one theme. What he has to deal with must be taken up at a moment's notice, be examined, tested, and dismissed at once; and thus his mind is ever kept occupied with the mental necessity of the world's passing hour."

From the Dublin University Magazine.

THE REVOLUTIONISM OF MIRABEAU.

THE moral is evolved out of the physical, and the extraordinary in animal structure has a kinship to the portentous in human action.

MIRABEAU, the infamous, born in an age, of a family, in a rank the most vicious in the annals of vice, of parents whose depravity had contaminated even their blood, was ushered with infinite difficulty into the breathing scene he was so much to trouble, and offered, at the outset of his disorderly career, misfortune and singularity in a twisted foot, a tied tongue, and two molar teeth.

Maltreated by fortune, which, at the age of three, turned him by disease into the ugliest of children—"a tiger marked by the small-pox,"—caressed and neglected by his dissolute mother, disowned and persecuted as a spurious graft in his house and home by the celebrated "Economist," his father—his very childhood presaged the disorders of his youth and manhood; and his father, mysteriously reverting to early crimes and calamities as the blight of his life, made it matter of complaint that Honoré Gabriel, as a boy, had more cleverness "than all the devils in hell," and seemed destined from his childhood "to disturb the monarchy, as a second Cardinal de Retz."

He was indeed *born* a Revolutionist; and if he had not found the elements of a *bouleversement*, was competent to have created them. But as nature gave the instinct, fortune supplied the breeding and the occasion. The heir, pupil, and victim of a second family of Atreus and Thyestes, the child was *trained* into demoralization, vicissitude, and daring. Believed himself to have been the favored lover of the most lovely of his sisters, he describes her as the "Atrocious memoir-writer," a "Messalina, boasting of the purity of her morals, and an absconding wife, bragging of her love for her husband." The Vicomte, his brother, "would have been a *roué* and a wit," he tells us, "in any family but his own," and *was*, of a dissolute noblesse, its most dissolute member. His mother, driven with contumely from her home and the bosom of her family, under accusations the most revolting a wife may hear from one who is

her husband and a father, addressed the world in public recriminations for her persecutor, not less disgusting or condemnatory. The son himself, the most infamous man of his time, completes the picture in the boast he made to the National Assembly, that among the tragic woes of his family he had been the witness of fifty-four *lettres-de-cachet*, seventeen of them on his own account!

As in Eastern climates the abundance of degenerate man will, at some spot and moment, reach a point where it breeds the plague which diminishes by depopulation the evil it cannot remove by more merciful agencies, so would it seem that in France the demoralization which necessitated a revolution, concentrating itself in one family, produced the man who was to begin the catastrophe.

At seventeen, leaving a military academy, he entered the army as a sub-lieutenant, knowing, as he tells us, a little Latin and no Greek, but possessing, with very tolerable acquirements in the mathematics, a fair share of the scattered erudition won by readings more desultory than diligent.

Presented at court, admitted to the rare aristocratic privilege of riding in the king's carriages at Versailles, laughed at as the Princess Elizabeth's living specimen of inoculation, the incipient courtier and embryo revolutionist was awakened from his delightful vision to find himself suddenly transferred from his regal residence and gayeties, to the sombre solitude of a country jail. He had been guilty of a passionate attachment to a young lady of disproportionate expectations.

The young victim of parental wrong, thus severely taught that the splendors of a court were but a veneer under which lay the terrible springs of a wayward tyranny, killed time in brooding over the ideas and studies which subsequently formed his "*Essai*," no less than his character—" *Sur le despotisme*." But before completing the work, the father's monomania had been temporarily mitigated by the vengeance of a year's imprisonment; and the son, instead of being sent to Surinam, the Dutch Sierra Leone of that day, was graciously permitted, under the *bourgeois* name

of "Buffiere," to enter as a gentleman volunteer the French army that was about to crush the Corsicans in their noble struggle against Genoese oppression.

In this liberticidal war, the liberty-loving Mirabeau performed his first manly act, won his first public distinction, and initiated that series of paradox, and moral revolutionism, that was hence to follow him as lover, *litterateur*, and politician, to the grave. As his sword was against Corsica and freedom, his pen was for them. He wrote over the ruins of both a boyish philippic, admired by his victims, and burnt by his father!

And while the brain that was to rule France as a tribune-king, was thus evolving its idle progeny, the womb of a Corsican woman near him was travailing with him who was to be Napoleon! At the instant France, by the sword of her future liberator, was mowing down the new-born liberties of Corsica—Corsica was breathing the breath of life into a child, whose sword was to cleave down the fresh-won freedom of France! As a Cæsar and a Marius sprung from the blood of the Gracchi, there would have been no Corsican exterminator for France, had there been no French exterminators for Corsica!* There are surely times when fate plays with mortals, making of the murder of a generation or the revolution of an empire a nursery game of coincidences!

Of the twenty years that followed, bringing Mirabeau to the footsteps of the revolution, and within two years of his death, it was the odd fate of this gay and gifted noble, guilty of no offence against the State, nor in a legal sense against society, to pass more than the moiety of his time in the sad rôle of a State prisoner; and the main incidents in the unhappy sequence of wrong and suffering, the inevitable but unrecognized logic of Providence, were briefly, and in succession, a profitless marriage with the most distinguished heiress of his province, carried off from twenty more eligible rivals by the superior strategy of seduction and defamation, pecuniary extravagance, dissipation, debts, sequestration of property, martial separation, successive imprisonments by paternal intervention, deadly hate with the father, permanent alienation from his adulterous wife and only child, licentious connection with a friend's wife, with whom he abandoned his country, exile in Switzerland, Holland, and England, successive litigations self-conducted, a min-

isterial spyship in Prussia, and a career more or less stormy, as a *litterateur*, in France.

Entombed in one of the horrid dungeons of Vincennes, solitary, hopeless, almost without a sympathy, though in the very spring-tide of his rich youth and activity, the angel of consolation, never far from us in our darkest hour, came down, and in the genial guise of literature, visited in his dungeon this man of infamies and suffering. It must, however, be confessed against him that, maddened by the severity of a despotism without appeal, in the wrong—and from that hand, too, whence he might fairly have hoped a kinder gift—even the wholesomeness of books became poisoned under his diseased digestion, and it became his wretched pleasure through months to avenge himself on the virtue in whose injured name he suffered, by licentious compilations, in which the man degenerates into the satyr, and the distinctions of right and decency are lost in the beastly excesses of a maniac imagination.

But so morbid a vice in a mind like his can be protected by no madness of the passions or vindictiveness of misanthropy from the healing influence of time; and if the leisure of his tedious incarcerations gave us four or five books in the worst of services, they gave us also those extensive studies of history and its philosophy to which we owe, among much else that is great in Literature or in Event, the three works on "Despotism," "State Prisons," and "Lettres-de-Cachet."

To our present purpose it would be of little use to indulge in any lengthened analysis or literary estimate of these performances. Gratifying his need of money, his love of fame, and, above all, a vengeance warmly nursed, which even virtue cannot censure, their publication formed, probably, the happiest incidents of his life. The first, published in his twenty-fifth year, bears all the characteristics of the young man of genius, roughened, no less than strengthened by the asperities of the experience out of whose ireful plenitude he writes. Rough and disorderly in arrangement, it is lofty, striking, eloquent in style—cogent, daring, powerful in matter.

The last, the result of his long, final imprisonment, and published in his thirty-first year, possesses similar attributes, aggrandized or improved. A great work, involving an inquiry into the first principles of government, and, therefore, of infinite practical utility in the career reserved for him, it wants too obviously the elevation of a Montesquieu, the philosophy of a Bolingbroke, or the com-

* It was this invasion that made Corsica a French island, and consequently, Napoleon Buonaparte a French citizen.

prehensive profundity of a Burke. It is a work of genius, but by a partisan, an advocate, a man of powerful emotion and vivid conception, having a strong will, a high purpose, and an enduring conviction. With a great, sometimes an inapt parade of erudition, and an occasional loss of time in inflated and declamatory commonplaces, there is yet, as a general rule, work, rather than literature, in his sentences, and the just, the practical, the statesman-like are the dominating qualities. We must not look for the artist in Mirabeau as a writer; he is above that: nor—whatever the range of thought we may justly concede him—may we, therefore, expect the sublime; he is below that. With the eloquence of an impassioned imagination, united to the unornamented vigor of a ready, versatile and comprehensive reason, he reminds one of some colossal engine in forceful, though not always in graceful action.

In Holland, occupied in literature and the society of literary men, and subsequently in England, in commerce with Franklin, Dr. Price, Samuel Romilly, and Wilkes—among whom be it said, *en passant*, he acquired the reputation of an habitual liar—a thousand circumstances must have presented themselves, not more in his own studies than in the freedom, seriousness, and activity he saw around him, to prepare and stimulate his ambition for the lofty career of political action that awaited him at home. In truth, if we may judge from the letters written during his English residence, or the biographical fragments that occur in his other correspondence, he seems, beyond his personal indigence, to have had no other enduring interest but that of public affairs. His mind broods over the tragic epochs of English history with a fascinated and curious sympathy: there is an evident faith in a coming drama of popular action for France, in which he is to play a leading part—a faith so early ripened that, in 1782, meeting at Neufchatel certain State Deputies of Geneva, he based on the inevitable meeting of the States-General the prediction, or rather the promise, that he would become a Deputy, and in that character restore their country to freedom.

Returning to Paris at a moment when the increasing and unmanageable deficit brought national bankruptcy and confusion to the very door of the State, a course of angry and mercenary pamphleteering on Finance, while connecting him with discontented men of wealth and influence willing—jointly with the police—to hire or use his ready pen, forced on him education in another—important, if un-

attractive—department of the great question of the times.

His ministerial spyship in Prussia, which, subsequently divulged by his own audacious publication of his secret correspondence, won from M. de Montesquieu the remark, that “the infamy of the person might be estimated by the infamy of the thing,” was not without its compensations in the political experience he extracted from it. It brought before him the main interests of European diplomacy; won him access to the principal intrigues and intriguers of a Court in transitionship, by the death of Frederick, from eccentric greatness to orderly mediocrity; habituated him to ministerial correspondence and reports, which, if disgustingly mean, were, at all events, systematic and prescient, and secured him—I could wish to say honestly—those historic and statistical *data* which, published in his elaborate work on the Prussian monarchy, countenanced some serious claims to statesmanship.

Misfortune, passion, solitude, suffering, travel, extraordinary adventures, extensive readings, varied studies, innumerable writings thus admirably endowing his mind—so disposed, too, by nature—for the daring and stormy struggles of the revolution, the only resource that could surely be wanting to so enormous a compound of intellectual strength—I mean the power of oratory—he was fated to acquire in his lengthened trials for the recovery of his wife and legal rights.

Opposed by Alps of difficulties, the moral greater than the legal, for the suits ploughed deeply into all the crimes of errors that had dishonored his career, and would necessarily turn up masses of documentary evidence which, on no less authority than that of his father, must carry the tale of his infamy to every eye; yet his audacity dared, as his genius surmounted, every disadvantage, and after fixing the admiration of a province—to him a sufficient compensation—by the ingenuity, the power, and the extraordinary resources of his eloquence in a path so new to him, he succeeded in re-establishing his civil rights, and but failed in the second, and, perhaps, less important suit, by the accident of a technicality.

Passing by his double election as a Deputy, at Aix and Marseilles, marked by excitement, insurrection, and all the stirring incidents that, in a moment of great public agitation, might be expected to accompany the *début* of a daring and accomplished demagogue, we are now brought to the greatest epoch of France, and, therefore, of Mirabeau

—the meeting of the States-General; and the observation is naturally suggested that, if this extraordinary succession of circumstances, marvelous as *incidents*, but still more marvelous as *coincidents*, had not specially moulded the man for his work, it might well be doubted that the French revolution could have happened, or at all events, in such gigantic proportions. Mirabeau's life was, as we have seen, a pupilage, as it is now to become a mastership, in revolution. His Saturn of a father had trained him, from his youth upward, into the executionership of his order; and Heaven itself, as if seconding some such inscrutable design, seems to have stooped to lead by the hand this servant of Nemesis, through paths the most devious and unfrequented, but, of all others, the most fitted to form and conduct him to the emergency.

A change, it is true, of some kind in French Government, accompanied by more or less confusion of blood-shed, had been long inevitable. Genius, good sense, suffering, luxury, oppression, contumely, unprincipledness and folly, each boon of nature, each wrong of man, had concurred, after more than a century of struggle, in necessitating a consummation.

In my opinion, the popular horrors that darkened the end of the eighteenth century, though pointed in their way by the finger of Mirabeau, legitimately trace their pedigree to the Royal grandeurs that closed the preceding one. The French Revolution was born of Louis the Fourteenth. His policy—his achievements—his failures, and, still more, his personal character and court deportment, killed monarchy in the hearts of the French people. The prominent ruling characteristics of himself and reign was an all-absorbing egotism. A maelström of selfishness, and unconscious of any law of reciprocity to arise from his relations to a common humanity, this Chief and Example of a numerous aristocracy was the grand centre to which was to be directed every affection and service, from which was to be circulated every volition and ordinance. And need I say that no eminence of intellectual power—no prudence of personal deportment—no brilliancy of external achievement, can or ought to have any effect on spectators so keen-witted and impressionable as the French, save to make additionally insupportable a character which, even on the smallest scale, is, of all others, the most odious and repulsive? The stern unity and perfection of order in which he was enabled to present politi-

cal power—that necessary evil of human existence—but added intensity to the hate, as it added grandeur to the idea of his despotism. In the eyes of his suffering subjects it brought him face to face with the catastrophes no less than with the glories of his reign, and without the merit of the avowal—*adsum qui feci!*—gave him all its dread responsibilities. An old despot, surviving his greatness while retaining the stinging irony of its title—a saint amid the standing reminiscences of his adulteries, expiating his pleasures by annihilating those of others, and tormenting consciences to save his own—his suffering and downcast people became at length disabused but too utterly of the base apotheosis of his person and character, so long maintained by him in the name of a false glory and debased religion. They even publicly rejoiced at a death-bed made pitiable by the absence of his mistress, confessor, and family; and meeting in mobs that, encountering his corpse on its way through by-lanes to hugger-mugger interment at St. Denis, they might tear it into shreds, gave early and portentous evidence that the germ of an even-ommed and bloody democracy had been elicited in the very perfection of his stern and heartless tyranny. The unblushing excesses of the Regent and of Louis the Fifteenth, who gratuitously withdrew the last veil that concealed the utter rottenness of all that claimed popular obedience, under the names of religion and authority, sufficed, though scarcely needed, to *complete* the discredit of the French monarchy; and, ascending his throne, surrounded by a dissolute clergy, an overbearing aristocracy, and a discontented and impoverished people, the robed Louis the Sixteenth seemed but the calf of atonement of the Scriptures decked for sacrifice, and doomed to expiate a century of court gayeties and crimes in which he had had no part!

Mirabeau began the revolution with a thousand vague hopes and expectations, and the conviction, communicated to his friend Mauvillon, that "it was not given to human sagacity to devise where *all this* would end." A living conflict of passions and principles, of low needs and high ambitions, of lofty genius and infamous repute—a demagogue by policy, an aristocrat by vanity, a constitutionalist by conviction—his public conduct anxiously and perpetually brought in evidence one or other of these conflicting agencies; but beyond the personal aim of recovering his rank, and winning some sort of greatness at any price, he was without one pervading

or dominant public purpose, save that of extinguishing the despotism that had injured him. Above all policies, *abstractedly* considered, this was the one dear to his heart. "I come here to grant, not to ask pardon," was his reply, in a voice of angry defiance, to some oratorical assurance that a life of usefulness might secure the pardon of his earlier delinquencies. A horrid, but too natural, vindictiveness had interwoven the hate of arbitrary power into every fibre of his brain. It was a passion or sentiment that he never abandoned: it may be even doubted if he could have been purchased out of it. Despite all the evils and mischances of life, there stood erect in his soul this one small altar to virtue, or something that resembled it, which he would have thrown down but under the direst necessity.

But of all the circumstances glanced at as furnishing the key to many of the paradoxes of his public conduct, one of the most important, though perhaps the least appreciated, is the dishonor of his repute. It is difficult, with his present position in history, especially when taken in relation to the now well-certified worthlessness of his contemporaries, to realize to the imagination the full extent of his infamy. "You dare," said his former friend Rulhiere, in a pamphlet that had a wide circulation—"You dare to speak of a country, Count Mirabeau! If your brow were not trebly bronzed, how must you have blushed at its very name! Have you one quality of father, friend, brother, husband, or relative? An honorable vocation? Any one attribute that constitutes the citizen? Not one! You are without a refuge—without a relative. I seek your most ordinary domiciles, and I find them but in the prison of Vincennes, the Chateau d'If, the Fortress of Ioux, the jail of Pontarlier!"*

Dumont, coming over to Paris, was so moved by the discredit attached, in respectable circles, to his acquaintance, that he visited him with repugnance and as a duty, but records the characteristic incident, that on his first call he was so won by the magic of his host's conversation, as to depart resolved on retaining, at all hazards, so agreeable a friendship. The mention of his name, with the sight of his person, at the opening of the States-General, elicited groans and hisses on all sides. The *Tiers-Etat*—whom he had honored by his aristocratic adoption—were unanimous in refusing him a hearing the two

or three occasions on which he first sought to address them. The Queen, whose life, family, and regal heritage were at stake, received the assurance, that such a person was willing to assist the views of the Court, with "the contempt due to vice!"* and "assassin!" "robber!" "slanderer!" were the epithets almost daily applied to him in the Senate of the nation! Society, expiring under the weight of its own vices, saw in him that well-defined excess that entitled it to the merits of purgation in his extrusism, of atonement in his martyrdom, and to place the hand of menace and malediction on his head, as the scape-goat of its redemption!

Thus detested by all parties, his low character keeping him low, Mirabeau, with all his marvelous power, found himself placed, by public contempt, more even than by private need, at the mercy of circumstances. Befoulment had so far eaten into his name, that, with occasionally the best of desires, and always the greatest of energies, there stood a blight over both. He felt that a moral leprosy encrusted him, which repelled the good, and kept aloof the prudent. The condemned inferior, in moral standing, of those that surrounded him, it was difficult to be honest, and impossible to be independent. By a sort of law of nature, too, his tarred repute attracted to it every floating feather of suspicion, no less than of guilt, as to its natural seat; and thus it happened that the lofty genius of Mirabeau, under the "grand hests" of a hateful necessity, like the "too delicate spirit," Ariel, tasked to the "strong biddings" of the "foul witch Sycorax," was condemned for a while to pander rather than teach—to follow rather than lead—to please rather than patronize—and to halloo others' opinions rather than vindicate his own!

No man could appreciate the misfortune more fully or sensitively than himself. Dumont tells us, that, taught by events that a good character would have placed France at his feet, "he would have passed seven times through the fiery furnace to purify his name;" and that, "weeping and sobbing, he was accustomed to exclaim, 'Cruelly do I expiate the errors of my youth!'" And, indeed, the more sensible his heart, the more rich and elevated his soul, the more must his torments have been bitter and redoubled; for the very preciousness of the gifts of nature, the charms of society—even the friendship of those that surrounded him—must have

* He had also been confined in two prisons, in the Ile de Re, and the Castle of Dijon.

* Madame Campan's Memoirs.

turned but to the increase of his wretchedness !

It is easy to understand, then, that the tactics of Mirabeau, in the first days of the Revolution, were those of a man outside "a swelling scene"—

"A kingdom for a stage, princes to act,
And monarchs to behold,"

which he could only occupy by rudely breaking through a thousand circumvallations of usage, propriety, and public opinion. As it was the boast of Luther, that he, an obscure monk, stood alone for some time against respectable Europe, so Mirabeau, on the eve of his public greatness, was the most isolated politician of his age. "Mean men, in their rising," says Lord Bacon, "most adhere ; but great men, that have strength in themselves, were better to maintain themselves indifferent and neutral." Instinctively feeling that this was the policy of his position, when repelled by both sides, he haughtily repelled them in return, and the more he was despised, the more inevitable did he make the establishment of his importance. As, without a party, he became one himself, so without a plan he took that of events, and without a policy was content with that of display. In these early days, indeed, his whole plan, system, and policy, was to make his individualism tell—to demonstrate, to all parties, what he was worth in journalism as a writer, in the Assembly as an orator, in everything as a statesman. As he had nothing but himself, it became his business to make the most of the commodity, which, so valueless in the beginning, ended in outwearing all that was opposed to it.

But if this policy of display, no less than his education, sympathies, and hates, bore him to the opposition, there were in his pecuniary wants, and his ambitious dreams of a statesmanship, *à la Richelieu*, circumstances that at times resistlessly brought him within the influence of court power. Uncertain how far he could overpower the disadvantages of his personal position, wounded that the movement party were little inclined to value his co-operation, and still less to accept his leadership, he early felt, or feigned alarm at the fermentation in the public mind, and its possible evolution in great national calamities ; and before one act of legislation was accomplished, or he had had a month's experience of the fanatical impracticability of one side, I use his own words, and the intolerant spirit of resistance on the other, he personally pro-

posed to his enemy, Necker, and through him to the Queen, "the only *man*," he said, "connected with the court," to concur, at the price of an ambassadorship to Constantinople, in supporting the court system of policy.

He appears to have fancied for some days that his proposals were accepted ; but before he could enter on any of the Eastern arrangements his active mind had already suggested, he learnt that the overture was rejected "with a contempt, which," as Madame Campan sagaciously admits, "the court would doubtless have concealed, if they could have foreseen the future." Contenting himself with the angry menace, "They shall soon hear some of my news," within a month he became the author of successive defeats, the most insulting a monarch could receive from his parliament, and which were fated to exercise an active influence in the overturn of that royalty he was afterward to defend.

The king, anxious to arrange the differences which kept the three orders aloof from each other, and from legislation, had sent to the *Tiers-Etat* a message, wise in its suggestions, and conciliatory in its tone. Under the eloquence of Mirabeau, the house passed to the order of the day.

Irritated by insult, and complaining that the antagonism of the three orders prevented any progress in the public business for which they were convened, the King summoned a general meeting of all the deputies, and after an address, in which he expressed his royal pleasure that the three orders should form separate chambers, he commanded the Assembly to disperse, that they might meet under the ordinances his prerogative had prescribed. The clergy, the nobles obey ; the commons remain uncertain, hesitating, and almost in consternation. The royal command is again communicated to them, with the intimation, that having heard the king's intentions, they had now only to obey. The crisis of the royal prerogative, obedience, hung but on the turn of a feather ; the repulsed Mirabeau arose and turned it against the King. "We *have*," said he, in a voice of thunder, "we *have* heard the intentions attributed to the King ; and you, sir, who have no place, nor voice, nor right of speech here, are not competent to remind us of them. Go tell your master that we are here by the will of the people, and that we are not to be expelled but by the power of bayonets !"

Cheered and supported by the now reassured *Tiers-Etat*, he next, in imitation of the

English parliament, carried, that the persons of the deputies were inviolate, that any one infringing that right should be pursued as an enemy of the country, and that the payment of taxes, till further legislation, should be obligatory only during the existence of the legislative corps.

Added to the bold title of "National Assembly," newly-adopted, these votes were the assumption of a kingship by the *Tiers-Etat*; and as public opinion enthusiastically backed the innovation, the divided peers and ecclesiastics were compelled at length to join, and be submerged in, the mass of popular deputies.

A civil war could alone stand between royal power and its destruction. For some weeks the court prepared for even such an eventuality. "Ministers play high stakes," writes Mirabeau, on the 5th of July; "they are compromising the King, for in menacing Paris and the Assembly they are menacing France. All reaction is equal to action: the more the pressure now, the more terrible do I foresee will be the reaction. Paris will not suffer itself to be muzzled by a bevy of nobles thrown into despair by their own stupidity; but they shall pay the penalty of the attempt. . . . The storm must soon break out. It is arranged that I ask the withdrawal of the troops; but be you ready (at Paris) to help the step!"

The demand was evaded by the King; the soldiery was largely increased and concentrated; the arrests of the more revolutionary deputies, including, of course, Mirabeau, were decided on; Necker was summarily dismissed: but on the other side, able and active emissaries roused Paris by statements the most exciting, and taking all characters, with the costumes of either sex, caressed, feted, and partially won over the soldiery, and before the court could take one step toward its purposes, Paris was in full insurrection; the troops corrupted or overpowered, the Bastille taken, and, under the plea of anarchical excuse, the whole *bourgeoisie* of Paris placed in a few hours under arms as National Guards.

The King, taught that it was not revolt, but revolution, preferred, as everybody foresaw, submission to civil war, recalled Necker, and visited triumphant Paris, at once the hostage and conquest of a popular triumph.

Mirabeau, more or less connected with the Orleanists, had speculated with them on the chances of confusion; for to him it was a small thing, provided he had bread, that it was baked in an oven warmed with the con-

flagration of an empire. Looking forward with complacency to every contingency of revolutionary crises, assured that a common danger, flinging aside, as unimportant, questions of personal character, would make power the prey of genius and audacity, he was correspondingly annoyed by a re-arrangement that promised for a time a well-grounded tranquillity.

The destruction of the Bastille securing that of "The Syllas of Thought," he now transformed into a full political newspaper, his weekly "Letter to his Constituents," under which title he had evaded, from the first assembly of the States-General, the censorship on the press. Aware, from his knowledge of Wilkes, and his history, of the power of journalism to a politician, and, above all, to a demagogue in a free country, he was, in the full sense of the term, the first newspaper editor of France, and owed to the vigorous use of this novel agency, not only useful additions to his pecuniary resources, but a great portion of that popular idolatry that followed him to the grave.

The Court, which, in calling together the States, had no higher aim than to regenerate the finances of the country, and as one step, to obtain the help of the people in stripping a numerous aristocracy of their baneful exemption from state-burdens, had already found out its own share in the peril of the experiment, and now sought, by a close alliance with the *noblesse*, to avert the ruin that too evidently menaced both. But the torrent had but accumulated at each irresistible concession, and every day's work added to the democratic elements of a constitution that had already made royalty a cipher, and annihilated as political institutions the church and aristocracy.

Of course new schemes of regal antagonism again raised their head, and again a popular manifestation, bringing Paris into the very boudoir of the Queen at Versailles, demonstrated the impuissance of all that took the name of French royalism. The October insurrection was fomented by Mirabeau and his Orleanist friends, for the same purpose as that of July, to secure personal safety and obtain a new scene of action, by terrifying the court into exile, or the acceptance of Orleans' protection. Had the duke been raised to the "lieutenant-generalship of the kingdom," Mirabeau counted on a premiership, in which he proposed to become the Chatham or Pitt of France. Had Louis the Sixteenth fled the kingdom after the example of the Comte D'Artois, he pur-

posed to proclaim a republic, and become its "first consul;" and should the doom be that France should be divided by civil war, and cut up into its old kingdoms, he speculated on a sovereignty in his ancestral country, Provence, which had already greeted him with so encouraging an enthusiasm.

Strangeness of event! While the monarchy so short-lived still survived the insatiate Mirabeau, two of the extraordinary contingencies he speculated on have already happened, to the profit of other actors, and the existing republic, in its mutinous armies, intolerant factions, and insane dynasties, offers no very improbable portent that, even after half a century of a centralized and well-fixed nationality, the old repartition of kingdoms may again present itself!

The great consummation of confusion, however, failed for the overmuch of means. "A bottle of brandy was given," said the orator, "instead of a glass!" and the mob's capricious *impromptu* of carrying the king back with them to Paris, still more than the cowardice of the Duke of Orleans, defeated this deep-laid Machiavelian combination.

Whatever the character, however, of the people's success, it could not but be an additional success for their leader. The revolution, of which he stood recognized the unquestioned head, was now beyond all danger of royal aggression, except by his own treacherous agency. In a campaign of unimaginable brevity, he had not only vindicated the first place as an orator in a senate now omnipotent, and become out of it the most potent demagogue of his time, but as *un homme d'état*, surrounded by a brilliant staff of the most active spirits and practical thinkers of the day, Camille, Desmoulins, Danton, Volney, Champfort, Lamourette, Cabanis, Reybaz, Dumont, Duroverai, Claviere, Servan, De Caseaux, Panchaud, Pellenc, Brissot, and others, was understood by every party to hold the future destinies of France in his hand. Emerging from two insurrections—possessing, by his power, all their profits, and by his adroitness none of their responsibility, he found it now worth his while to break terms with the Duke of Orleans, by a public expression of his contempt for him as a scoundrel not worth the trouble that might be taken for him; and excluded from the ministry, that lay open to him, by a self-denying ordinance of the Assembly directly leveled at his pretensions, he accepted a large subsidy from the King's brother—the Comte de Provence—and formed with him, for the restoration or upholding a monarch-

ical authority, a mysterious and ineffective conspiracy, the character and extent of which may be conjectured from its involving the assassination of the Marquess de Lafayette.

The hate of Mirabeau for this worthy but feeble nobleman—his diligent colleague in the struggle for liberty—was as intense as, at first sight, it seems incredible. He was his Mordecai at the king's gate, for whom he could neither sleep nor eat. Remembering that Mirabeau's passion for complicated intrigue and daring adventure, even in politics, was extravagant to disease, it seems possible that, as he advanced in his rapid greatness, he secretly nursed projects or hopes as incompatible with a constitutional monarchy, and an organized public force, in respectable hands, as with the despotism with which he originally battled; and that, in his successive conspiracies, now with the Republicans and Orleanists, now with the Count de Provence, and the Queen, he had no fixed intention of ultimately benefiting those he professed to serve; but proposed to use them as ladders to that exalted position of a Sylla or a Cæsar, which, as Buonaparte subsequently proved, was no more, perhaps, beyond his grasp than his ambition; influenced by the insidious suggestions and doubts he carefully spread abroad, the Queen, as he saw with pleasure, looked on the new commander of the National Guards as a "Grandison-Cromwell," (Mirabeau's damaging epithet,) whose concealed ambition aimed at the Constableness of France, as a step to that dread of French sovereigns, the "Mayorship of the Palace;" and hence the Court systematically declined the aids it might so often have derived from the honesty, the popularity, and sometimes the good sense, of the American volunteer. At all events, we know that the assassination of Lafayette—twice, it seems, plotted—would have left the National Guards in the hands of some less popular and more pliant chief; and that, when the general specifically accused his rival of the horrid project, naming time, place, and means, he won no better defence than the reply, "You were sure of it, and I am alive! How good of you!—And you aspire to play a leading part in a revolution!" The compact with the Comte de Provence was of short duration: the Queen began to distrust the personal views of her brother-in-law, who threatened to become the Duke D'Orleans of a Philosophical party; and Mirabeau, to whom popularity was the only capital, probably found that he could not afford the sacrifices his employers demanded.

To preserve the *status quo*, and wait events, became now, for some weeks or months, as much his policy as his accessibility to passion and sudden influences would permit. He seemed to feel that he should give time to the molten lava of his volcanic greatness to settle, harden, and assume its individualism among things received. Holding aloof, therefore, from identification with either party—leaning now on one side, now on the other—his speeches more with the Movement, his policy more with the Court—forcing both parties into explanation, while keeping himself, however, disengaged—he constituted himself their arbitrator and moderator, overawing both extremes; and while maintaining his pre-eminence of political influence, held himself ready to take advantage, at the least cost of consistency, of any fundamental change in the position of affairs.

In the month of May or June, however, a private interview with the Queen, in the Royal Garden of St. Cloud, followed by others, to the renewed scandal of her fame, laid the foundation of a new compact with the Court, and a more decided policy. The chivalry of Mirabeau revived under the enthusiasm won by "Earth's loveliest vision"—a queen in distress and a suppliant—and he pledged himself, as the Hungarians to her royal mother, to die in the service of saving her throne. But the highest endeavors of Mirabeau have always at their base, like the monuments of his country, the filthy and the repulsive; and the chivalry of this new saviour of the monarchy received sustentation in a bribe—higgled for through months—of twenty thousand pounds, and a pension of more than that per annum.

About the end of the year, three or four months before his death, he opened systematically his great campaign for what professedly was the restoration of regal authority. He was to outhrow in patriotism the herods of the Jacobin club; the Court was to dare everything short of civil war—perhaps, even that; and the existing confusion, whatever it might be, was to be cured by another of greater extent, artificially induced by the charlatanism of art political. His scheme, in some points, it must be allowed, successfully imitated in our own days in Prussia, was:—

First—To reorganize the party of Order in the Assembly; and while, as far as possible, winning for it the sympathy of the country, to excite, by all available agencies, distrust and discontent with the opposing majority.

Secondly—To inundate the provinces with publications against the Assembly; and by commissioners, sent nominally for other purposes, to obtain remonstrances from the departments against its further continuance.

Thirdly—At a proper opportunity, to dissolve the Assembly, and order fresh elections; at the same time canceling the Constitution as illegal, and granting another by royal charter, formed on a popular basis, and on the written instructions which (on a system unknown to England) had originally been drawn up for each deputy by his electors.

I shall not descend to discuss the oft-mooted point, how far the wholesale venality that based the project is justified or palliated by the object it is supposed to have had in view, because I know that with Mirabeau money was not a *means* to his defence of constitutional monarchy, but his defence of constitutional monarchy a means to money. If we except his relentless hate to French despotism in any hands not his own, the principles, moral or political, of this leader of a nation had no other tenure but the interest of his personal aggrandizement.

On another debate, whether with a longer life he could have carried his counter-revolution to success, I will only remark, that, conceding that in robust health he would have had it at heart as sincerely as in the recorded hours of his sickness and despondency, it may be admitted, that a struggle which, under every imprudence, seemed long to hang in doubt, with the aid of his energetic and masterly polity might, perhaps, have poised for royalty. But it is not to be concealed that the difficulty of arresting and unmaking were even greater than those of creating and consolidating the Revolution. The King's aversion to decisive measures, and well-known horror of civil war, made him the worst of colleagues for the only policy his tool could wield with effect; and the great demagogue himself, when obliged to discard the mask of democratic hypocrisy that still partly hid the subtle and venal traitor of his party, would have lost, like Strafford, many of the elements of his potency; and despoiled, especially, of the miraculous resources of his eloquence, must have contented himself with that lucid, common-sense, consecutive daring, and power of strategic combination, which his new friends were so ill-fitted to support.

Fortunately, perhaps, for his future fame, he died ere the structure his arts had undermined tested his powers of reparation, and before that wonderful magic of popular-

ity which had so long survived, as it had, indeed, so long anticipated, his deserts, had time to vanish under the cock-crow of truth. His death was as well-timed as his political advent, and has been praised by French wit as the best evidence of his tact; for the expectations which the unparalleled rapidity, no less than the innate marvelousness of his achievements had raised, no future activity and fortune, scarcely those of a Napoleon, could have realized.

But if the retrospect of his career must convince us that one man in so short a period never accomplished so much before, against such disadvantages, so also must we admit that probably never before did any one rest so wholly for his amazing achievements on the sole power of intrinsic genius. It was intellect that did all with Mirabeau; and made his head, according to his own boast, a power among European states. It united almost every possible capacity and attainment. His rare and penetrating powers of observation were sustained by the equal depth and justness of his discrimination, and the rapidity and accuracy of his judgment. Uniting, to his admirable natural capacity, an activity and habitual power of application, more marvelous almost in their extent than even in their rare combination, he possessed an understanding full, beyond precedent, both of the recorded knowledge of books, and of that priceless experience of men and things without which all else is naught; and as the complement of these amazing and unparalleled advantages, he had the still rarer advantage of a felicity and power of diction every way worthy of so incomparable a genius.

Looking with contempt at the stiff, ornamental, and childish antithetical style of his day and nation, he welded the flimsy elements of the French language into instruments of strength akin to his own conceptions, and wrought out of them a style for himself in which a Demosthenic simplicity and severity of language is sustained by an earnest and straightforward power which vivifies and amplifies all that it touches. Startled by an innovation far beyond the conceptions of the French Academy, the writer was smiled at and neglected by the critics; and it was not till they heard him launching from the tribune the thunders of justice, disposing at pleasure of the inclinations of the multitude, and subjugating even the captious by the imperious power of his eloquence, that they began to discover that

there was a "power of life"* in his rude and singular language; that "things, common-place, in his hand became of electric power;"† and that, standing "like a giant among pigmies,"‡ his style, albeit "savage,"§ dominated the assembly, stupefying, and thundering down all opposition.

It is the affliction of history, that, while raising her monuments to gigantic genius, she is compelled so often to record an immorality of parallel proportions. It is right that the infamy of Mirabeau should be as eternal as his greatness. He was a man who, in his political, as in his private life, had no sense of right for its own sake, and from whom conscience never won a sacrifice. With great and glorious aims at times, he never had a disinterested one. His ambition, vanity, or passions, were his only standard of conduct—a standard, be it added, which, despite the wonderful justness of his judgments, the depravity of a sunken nature kept always below even his needs. Policy with him was often but a campaign of vengeance or market of venality, and the glorious exercises of literature but a relaxation of indecency or business of wrong. In the study, in the tribune, or in the council-chamber, glory was the only element that remained to counterpoise, often with a feather's weight, the smallest influence of gold or spleen; and in the most critical epoch of an empire, the poisoning of his tremendous influence—the influence of so much earnestness and magical power—was the accident of an accident. We admit for him, in palliation, the demoralizing influence of terrific example, and of maddening oppression; but where is the worth of a morality that, in a man of heroic mould, will not stand assay?—and what is virtue but a name, if she may be betrayed whenever she demands an effort?

But however much a moral wreck was the heart of Mirabeau, nature, true to the harmony, no less than the magnificence, of her great creations, had essentially formed it of noble and gentle elements. Touched to the core by the contaminating influence of "time and tide," its instincts were yet to the kindly, the generous, and elevated; and those about him who knew him best—attached to him more by his affections than his glory—eagerly attested that in the bosom of this depraved citizen resided most of the qualities which, under happier agencies, would have made

* Madame de Stael. † Bertrand de Moleville.
‡ De Levis. § De Ferrieres.

him a dutiful son, a devoted husband, an attached friend, and truly noble character!

In fine, with an eye to see at a glance, a mind to devise, a tongue to persuade, a hand to execute, this great man was circumspect in recklessness, poised and vigorous in violence, cool and calculating to a minutia in audacity and passion. As a friend, affectionate and volatile—as an enemy, fierce and placable—as a politician, patriotic and venal. Proud of his patricianship, whose *status* and manners he had lost, he is humble about a statesmanship that makes the first of his glories. The best of writers, his works are written for him; the greatest of orators, his speeches are made for him! Has he the most unerring of judgments? He prefers

another's! Is he a popular tribune? He is also a royalist parasite! Is he earnest? He is then insincere! Does he evidence great principles? He seeks bribes! Does he enforce moderation? He awaits vengeance! Does he cause confusion? He is seeking order! Would he save the nation? He is selling its liberties! Wonderful man! great with enormous weaknesses, bad with many excellencies, immortal by the expedients of an hour, his genius is a combination of almost impossible perfections, as his political life the colossal result of a thousand contradictions. United, they yield a deathless character, whose Titanic proportions shall, age after age, be huger, as the mighty shadows that cover it shall grow darker!

LINES.

Oh bring me pearls and jewels rare,
With these I'll braid my sunny hair:
I would be beautiful to-night—
The gayest 'mid the gay and bright.
Look! I have chased my tears away,
And smile as in life's early day;
And see how well this wreath doth shade
The lines that grief and care have made.
Oh none shall know this brow is aching;
Oh none shall guess this heart is breaking!

The first 'mid the joyous throng
My voice shall join the laugh, the song;
They say its tones were once so clear,
That when they fell upon the ear,
The dark heart would forget its guile,
And saddest eye look up—and smile.
Oh I will laugh and sing once more
As gayly as in days of yore;
And none shall know this brow is aching;
Oh none shall guess my heart is breaking!

I never cared for beauty's power;
And never, till this darksome hour,
Did pearl, or flower, or diamond rare
Deck the long tresses of my hair.
But oh, to-night their aid I'll seek:
They'll lend a radiance to my cheek,

And give the light of bygone years
To eyes that have grown dim with tears;
And none shall know this brow is aching;
Oh none shall guess my heart is breaking!

Perchance in that triumphant hour
When mine is wealth, and pride, and power,
Our eyes may meet; and on his ear
May fall the voice he loved to hear,
Recalling days that long have fled—
Forgotten vows, and sweet hopes dead.
Oh bring me pearls and gems most bright—
I must be beautiful to-night.
He must not know my brow is aching;
He must not guess my heart is breaking!

* * * * *

Away—away! these gems, and tear
These gaudy flowers from my hair:
Oh I have borne their weight too long!
What care I though the brilliant throng
Should kneel and worship at my shrine?—
The only smile I sought was thine,
And that, alas, was turned aside!
What cared I then for beauty's pride?—
Oh how my burning brow is aching;
Alas—alas, my heart is breaking!

From Sharpe's Magazine.

RECOLLECTIONS OF THE LATE THOMAS CAMPBELL.

BY ONE OF HIS PERSONAL FRIENDS.

"OFT let me range these gloomy aisles *alone*;
Sad luxury! to vulgar minds unknown;
Along the walls, where speaking marbles show
What worthies form the hallow'd dust below;
Proud names, who once the reins of empire held;
In arms who triumph'd, or in arts excell'd;
Chiefs graced with scars, and prodigal of blood;
Stern patriots, who for sacred freedom stood;
Just men, by whom impartial laws were given;
And saints, who taught and led the way to heaven!"

WE have just returned from a visit to POETS' CORNER. How solemn and impressive was the scene! The morning service had not yet commenced. The solemnity was increased by the profound stillness; but every tomb, bust, and cenotaph, seemed to address us in words that, without striking the ear, passed at once to the heart. Beneath us were the ashes of heroes, statesmen, poets, and philosophers—of men whose names stand forth as landmarks in our national history—each, with his deeds emblazoned on its page, showing to future aspirants by what labors in her cause he had earned the gratitude of his country, the love and admiration of his fellow-citizens, the honor of "civic crowns," and the meed of immortality.

"Peace, love!—the cherubim that join
Their spread wings o'er Devotion's shrine—
Prayers sound in vain and temples shine
Where ye are not.
The heart alone can make divine
Religion's spot!"

After a brief survey of the sculptured trophies that encrust the walls, or rise in breathing effigies from their pedestals, we turned to a small, black, lozenge-shaped marble, in the pavement, inscribed with the name of THOMAS CAMPBELL,* in brass letters, and placed over the Poet's remains by his executors. At the sight of this—the brief

memorial of a poet whom we had long known, loved, and admired—we felt as if riveted to the spot; we lost sight of the finished sculptures, the labored inscriptions, the classic elegance, the pathetic eulogies, which had thus far engrossed our attention, and felt all our thoughts concentrated on that little spot in the hallowed pavement. How many of his pure and lofty strains now rushed upon the memory! and, in accordance with the time and place, what could be more appropriate than these lines?—

"Daughter of Faith! awake, arise, illumine
The dread unknown—the chaos of the tomb!
Melt and dispel, ye spectre doubts that roll
Cimmerian darkness o'er the parting soul,—
The strife is o'er, the pangs of nature close,
And life's last rapture triumphs o'er his woes.
Hark! as the spirit eyes, with eagle gaze,
The noon of Heaven, undazzled by the blaze,
On heavenly wings, that waft her to the sky,
Float the sweet tones of star-born melody:
Wild as that hallow'd anthem sent to hail
Bethlehem's shepherds in the lonely vale,
When Jordan hush'd his waves, and midnight
still
Watch'd on the holy towers of Zion Hill."

* * * * *

Campbell, as it now appears from a passage in his "Life and Letters,"* had in early life a strong presentiment that his dust would one day find a resting-place with that of the

* "THOMAS CAMPBELL, died June xv. 1844, *Ætatis* 67." Surmounted by a brass wreath.

* Life and Letters of Thomas Campbell, by Dr. Beattie, his literary executor.

glorious dead in POETS' CORNER. Writing to an accomplished friend, whose correspondence occupied a large portion of his time and heart, he expresses a hope that something much better than his previous poems would yet pass from his hands before being "carried to his place in Westminster Abbey." To this, however, he never alluded but in a playful way; and in another case, when it was gravely proposed to him to bequeath his mortal remains for interment in the Glasgow "Necropolis," he facetiously declined the honor, on the ground of a prior engagement; and hoped the party who solicited this favor would be in no hurry to disturb the virgin soil for his accommodation. Latterly, however, the subject of dissolution, as we can well remember, was never treated with levity: during the last two years he spent in London, he adverted to it as the *Rubicon*, over which he had to pass to the shores of immortality. But—

"What is the bigot's torch, the tyrant's chain?
I smile at death, if heaven-ward hope remain!"

* * * * *

Campbell, as we have reason to believe, paid a solitary visit to this "Corner" of the Abbey, on the very eve of his departure to Boulogne. By what train of feelings he was led to the sacred spot, may be easily imagined. He was at the time, as we learn from his own letters, neither well in health nor easy in mind. He had, in fact, a heavy load upon his spirits, a "forecast of death," which nothing could remove; and as the physical malady increased, so did the mental suffering. But with this we have at present nothing to do. It is sufficient to say, that to part with friends—few, but strongly attached, and whose society had become more and more necessary, as the lengthened shadows, and the darkening path, foreboded the close of his pilgrimage—occasioned a severe mental struggle, which, although he made a manly effort to conceal it, shook his attenuated frame, and saddened all his prospects. Could he have been rescued at that moment from the ill-advised and fatal project of expatriating himself, the black, funereal tablet, on which we now read his name, might for some years, at least, have waited for its fatal record. But the die was thrown; he had ventured his life upon the cast; and, anticipating the too probable result, he repaired to the Abbey to take a last twilight view of the sepulchral trophies and tablets, under which so many of those whom he had known

in their lives, or revered in their writings, had mingled their honored dust. The hour chosen for this act of homage, was in the stillness of a summer evening, when the vespers chimes had died away; when silence, such as we now found it, pervaded the scene; and when the slanting rays that shone through the western window threw a gleam of evanescent warmth and life into the cold marble, which so profusely adorns the nave and aisles. How long he lingered among these trophies, or on what particular bust or statue he dwelt with melancholy interest, we need not inquire. A considerable number of those to whom monuments have been decreed within the last twenty years, were personal friends of the Poet; and of these, no doubt, each had a parting glance, as he threaded the long-drawn aisles, crossed the chancel, and then returned to the south transept. Here, as usual, he paused before the bust of Goldsmith, whose sweet and polished numbers it had been his earliest ambition to emulate!—

"In what new region, to the just assign'd,
What new employments please th' unbodied mind?

A winged Virtue, through th' ethereal sky,
From world to world unwearied does he fly?"

The next day the Poet took hasty leave of one or two friends, and started for Boulogne; which was destined to prove as ungenial to his mind and taste, as the scene of the *Tristia* was to the Roman poet in his exile. But as this portion of his life's history is already before the public, we turn to the brighter side of the page; and, looking back through the long vista of scenes still familiar to the mind's eye, endeavor to collect a few detached features of that intellectual portrait, which it has been found so difficult to paint.

In his social moments, and in the society of kindred spirits, Campbell was the delight of his circle. His happiness was never so great as when it arose from the consciousness of having promoted the interests, and added to the happiness, of others. He was a stranger to that selfishness which narrows the circle of benevolence, and withers the kindly sympathies that should unite men as members of the same brotherhood—heirs of the same hope. He never deserted the unfortunate: on the contrary, he sought them in their obscurest retreats, and never left them without some expression of practical

benevolence. The consciousness of having inflicted pain by any word or sentence unadvisedly written or spoken, caused him more pain than it did to the person against whom it was directed. Strongly impulsive in feelings, he spoke often hastily, but always reflected at leisure; and, like most men who do so, frequently regretted in our hearing that the force of reason was borne down by the stronger current of his feelings. If the topic to be discussed were of sufficient weight and importance, his opinion was delivered with force and perspicuity, but rarely with that coolness which marks the practiced and deliberate orator. In stating a question, such as that of "Classical Education"—a favorite subject—he always appeared to advantage, always fixed the attention of his hearers; but, in replying to objections, he was apt to become excited; and instead of refuting his antagonist, was hurried into expressions of contempt for the argument, which, although from their pointed wit they gained him momentary applause, did not raise him in the estimation of those who think profoundly, and speak soberly and advisedly. Whenever he was sure of a patient hearing, and where he was pleased with his hearers, he seldom failed to make a most favorable impression. In presence of the "Senate of his native University," which comprised in its members an epitome of all that is eminent in the walks of acquired science or mental cultivation, he pronounced an inaugural discourse that will long be remembered, and quoted, as a specimen of ornate and manly eloquence which has been rarely equaled, never surpassed, by any of the master-spirits who have spoken from the Rector's chair.

Of his few surviving friends some may, no doubt, remember the passionate eloquence with which he so frequently urged his appeals in favor of the Polish refugees; and none, we will venture to say, can ever forget the consummate skill, indefatigable zeal, and lucid arrangement with which he suggested, planned, supported, and almost perfected the scheme of a London University. The honor of having originated this great national seminary was all his own; but, like other illustrious benefactors of mankind, feeble and contemptible efforts have been made to strip him of this well-meited honor, and to crown the "lieutenant," if we may so express it, "with those very laurels which were won, and should have been worn, by his general." But we leave this question in abler hands, and in the earnest hope that

whenever a monument is raised to the founder of the London University, it will be inscribed with the name of Thomas Campbell. *Palmarum qui meruit ferat.*

Thinking of this and other wrongs, not less flagrant though less familiar, which private pique or the virulence of party feeling have sought to inflict upon the poet's memory, it was some consolation to observe the site chosen for erecting to his memory the splendid statue lately exhibited at the Royal Academy. This classic production is from the chisel of Mr. Marshall, who, in executing a monument to the genius of Campbell, has added new testimony to his own. The site is on the east side, exactly opposite that of Addison, whose classic statue, long a principal ornament of the "Corner," is soon to be confronted by that of a truly kindred, and no less moral poet. The pedestal is to be formed of a solid block of Carinthian marble, a votive offering from the "Polish exiles to the poet of Freedom," the most intrepid defender of their cause. It is much to be regretted, however, that, owing to the suspicious vigilance of a northern government, the accomplishment of this design is indefinitely postponed; but a substitute for the prohibited offering is already found, and on that basis the statue of Campbell will very shortly be erected. So far, the country will have done its duty.

Here we were joined by a Scottish friend, who took a deep interest in the subject.

"And have his old friends," we inquired, "come promptly forward? Have the subscriptions poured liberally in?"

"Neither promptly nor liberally," was the reply.

"But surely his native city—with its professors, merchants, citizens—has set a noble example."

"Yes," he added, "three small subscriptions from two family relations and an old pupil."

"Nothing more?"

"Nothing more;" and he handed us the list.

"But Edinburgh, the modern Athens, where the poet was feted, flattered, and almost idolized,—surely Edinburgh has made herself prominent in the subscription?"

"Yes. Lord Jeffrey has promised five pounds, and we are encouraged to hope that the subscriptions* collected between John

* It is gratifying to add, that since this was written, several new subscriptions have been sent in.—Ed.

o' Groat's and the guid town of Berwick on Tweed, for the 'Campbell Monument,' may amount at least to the braw sum o' fifty pounds."

This was rather a humiliating fact, but as love to the man does not necessarily extend to his monument, we must look to England for the nine hundred and fifty pounds to make good the thousand, and thus far we have not looked in vain.

"And what has Ireland done—I mean his admirers in that country, for he certainly had many, and deservedly?"

"Why, in point of subscriptions," said our friend, "it must, I fear, be 'Erin go Bragh,' that is, let 'Erin be scot-free;' and thus far, indeed, she has maintained her freedom from subscription."

To you, then, "Ye mariners of England," shall we look for a long pull and a strong pull in our endeavor to raise a monument to the poet, whose genius raises a monument to you.*

Alas! half-pay leads to half-measures; hands that would gladly have held out their contributions, must be content, in these piping times of peace, to lift the wine-cup in silence to his memory, as he himself raised it to "the gallant, good Riou," singing in his trumpet-toned lyric—

"Brave hearts! to Britain's pride
Once so faithful and so true;
On the deck of fame who died
With the gallant, good Riou:†
Soft sigh the winds of Heaven o'er their grave!
While the billow mournful rolls,
And the mermaid's song condoes,
Singing—Glory to the souls
Of the Brave!"

* * * * *

But we turn from this rather dispiriting topic. In his intercourse with society, Campbell was a shrewd observer of those often contradictory elements of which it is composed. Adverting to the absurd and ludicrous, he had the heart or talent of heightening their effect by touches peculiarly his own; while the quiet gravity with which he related his personal anecdotes or adventures, added greatly to the charm, and often threw his unsuspecting hearers into uncontrollable fits of laughter. Nor was the *pathos* with

* It will be the amusing, perhaps humiliating task of some future biographer of the poet, to compare the living professions with the posthumous acts of his warmest admirers.

† The "gallant, good Riou," Nelson's words in the dispatch.

which he dilated on some tale of human misery less captivating; it runs through all his poetry, and in hearing or relating a story of human wrongs or suffering, we have often seen him affected to tears, which he vainly strove to conceal by an abrupt transition to some ludicrous incident in his own personal history. As an example, which has not yet found its way to the public, we may relate the following, which he told one evening in our little domestic circle where he was a frequent visitor, and where the conversation had taken, as he thought, a somewhat too serious turn:—

"In my early life, when I resided in the island of Mull, most of those old feudal customs which civilization had almost banished from the Lowlands, were still religiously observed in the Hebrides—more especially those of a social and festive character, which it was thought had the effect of keeping up old acquaintance, and of tightening the bonds of good fellowship. Rural weddings and 'roaring wakes' were then occasions for social rendezvous, which were not to be overlooked. Both these ceremonies were accompanied by feasting, music, dancing, and that liberal enjoyment of the native *broust* which was too often carried to excess. I was in general a willing and a welcome guest at these doings; for, smitten as I often was with melancholy in this dreary solitude, I was glad to avail myself of any occasion that promised even temporary exhilaration. Well, the first of these meetings at which I was present one evening, happened to be a *dredgee*, a term which I need only explain by saying that it was got up for the sake of a young widow, who had just put on her weeds, and stood much in need of friendly sympathy and consolation. At first it was rather a dull affair, for the widow looked very disconsolate, and every look of her fair face was contagious. But as the *quaigh* was active, and the whiskey went its frequent round, the circle became more lively; until at last, to my utter astonishment, the bagpipes were introduced; and after a *coronach* or so—just to quiet the spirit of their departed host—up started a couple of dancers, and began jigging it over the floor with all the grace and agility peculiar to my Hebridean friends. This movement was infectious: another and another couple started up—reel followed upon reel, until the only parties who had resisted the infection," continued the poet, "were the widow and myself,—she, oppressed with her own private sorrow, and I, restrained by courtesy from quitting her

side. I observed, however, that she 'kept time' with her hand—all unconsciously, no doubt—against the bench where we sat, while her thoughts were wandering about the moorland *Cairn*, which had that very morning received her husband's remains. I pitied her from my very heart. But, behold, just as I was addressing to her one of my most sympathizing looks, up came a brisk Highlander, whose step and figure in the dance had excited both admiration and envy; and, making a low bow to the widow, followed by a few words of condolence, he craved the honor of her hand for the next reel. The widow, as you may well suppose, was shocked beyond measure! while I, starting to my feet, made a show as if I meant to resent the insult. But she, pulling me gently back, rebuked the kilted stranger with a look, at which he instantly withdrew. In a few minutes, however, the young chieftain returned to the charge. The widow frowned and wept, and declared that nothing on earth should ever tempt her to such a breach of decorum. But the more she frowned, the more he smiled and pressed his suit: 'Just one reel,' he repeated; 'only one! Ailan of Mull, the best piper in the Isles, was only waiting her bidding to strike up.' The plea was irresistible. 'Weel, weel,' sighed the widow, rising and giving him her hand, 'what maun be, maun be! But, heh, sirs, let it be a lightsome spring, for I hae a heavy, heavy heart!' The next minute the widow was capering away to a most 'lightsome' air—hands across—cast off—down the middle, and up again. And a merrier dredgee," concluded the poet, "was never seen in Mull."

On another occasion, when he presented a copy of some verses, which he had just finished, to a lady of our family, he described their origin as follows:—"Many years ago, while I was sealed up in the Hebrides, I became intimate with a family who had a beautiful parrot, which a young mariner had brought from South America as a present to his sweetheart. This happened long before my arrival in Mull; and Poll for many years had been a much-prized and petted favorite in the household. He was a captive, to be sure, but allowed at times to be outside his cage on *parole*; and always observing good faith and gratitude for such indulgence, they were repeated as often as appeared consistent with safe custody. The few words of Gaelic which he had picked up in his voyage to the north, were just sufficient, on his arrival, to bespeak the good-will of the family, and recommend himself to their hospitality;

but his vocabulary was soon increased,—he became a great mimic,—he could imitate the cries of every domestic animal,—the voices of the servants:—he could laugh, whistle, and scold, like any other biped around him. He was, in short, a match even for Kelly's renowned parrot: for although he could not, or would not, sing 'God save the King,' he was proficient in 'Charlie is my Darling,' and other Jacobite airs, with which he never failed to regale the company, when properly introduced.

"Poll was indeed a remarkable specimen of his tribe, and the daily wonder of the whole neighborhood. Years flew by: and although kind treatment had quite reconciled him to his cage, it could not ward off the usual effects of old age, particularly in a climate where the sun rarely penetrated within the bars of his prison. When I first saw him, his memory had greatly failed him; while his bright green plumage was fast verging into a silvery gray. He had but little left of that triumphant chuckle which used to provoke such laughter among the youngers; and day after day he would sit mute and moping on his perch, seldom answering the numerous questions that were put to him regarding the cause of his malady. Had any child of the family been sick, it could hardly have been treated with greater tenderness than Poll.

"At last, one fine morning, just as the vernal equinox had blown a few ships into harbor, a stranger was announced, and immediately recognized by the master of the house as a 'Don' something—a Spanish merchant, whose kindness to a young member of the family had been often mentioned in his letters from Mexico. One of his own ships, a brig, in which he had made the voyage, was then in the bay, driven in by stress of weather, for Mull was no market for Spanish goods. But that was not my business; he would most likely pay a visit to Greenock, where, in the present day at least, Spanish cargoes are rife enough.

"No sooner had their visitor exchanged salutations with the master of the house and his family, than the parrot caught his eye; and, going up to the cage, he addressed the aged bird in familiar Spanish. The effect was electric: the poor blind captive seemed as if suddenly awakened to a new existence; he fluttered his wings in ecstasy—opened his eyes, fixed them, dim and sightless as they were, intently on the stranger; then answered him in the same speech—not an accent of which he had ever heard for twenty years.

His joy was excessive—but it was very short; for in the midst of his screams and antics, poor Poll dropped dead from his perch."

Such was the incident upon which Campbell composed the little ballad entitled "The Parrot." It had taken strong hold of his memory, and after the lapse of forty years,* found its way into the pages of the "New Monthly," and is now incorporated with his acknowledged Poems. The following is an extract:—

"The deep affections of the breast,
That Heaven to living things imparts,
Are not exclusively possess'd
By human hearts.

* See "Life and Letters of Campbell." Vol. I. Residence in Mull.

A parrot from the Spanish Main,
Full young, and early caged, came o'er,
With bright wings, to the bleak domain
Of Mulla's shore.

But petted in our climate cold,
He lived and chatter'd many a day:
Until with age, from green and gold,
His wings grew gray.

* * * * *

At last, when blind and seeming dumb,
He scolded, laugh'd, and spoke no more,
A Spanish stranger chanced to come
To Mulla's shore;

He hail'd the bird in Spanish speech;
The bird in Spanish speech replied,
Flapp'd round his cage, with joyous screech—
Dropt down, and died!"

THE EMIGRANT MOTHER TO HER CHILDREN.

BY MRS. TRAILL,

AUTHOR OF "THE BACKWOODS OF CANADA."

My children, would you knew the land,
The pleasant land—the free,
Where once a careless child I roved
O'er woodland hill and lea!

There daisies lift their starry eyes
To greet you as you pass,
And there the sweet low violet blows
Unseen amid the grass.

And merry 'tis at matin prime
The joyous lark to hear,
The blackbird with his bugle note
That singeth loud and clear;

The linnet and the mellow thrush,
"The lovelorn nightingale,"
That to the lonely ear of night
Telleth her mournful tale.

And sweet it is on Sabbath morn
The pealing bells to hear,
Oh, sweeter far than song of birds,
They tell us God is near.

And many a pleasant sight there is,
And pleasant sound to hear;
My children, 'tis my native land,
Oh! would that we were there.

But oh! that loved, that blessed land
Thy mother ne'er will see,
Where the dark woods wave must be her grave,
'Neath the lonely hemlock tree.

From the Dublin University Magazine.

THE GIFTS OF SCIENCE TO ART.—PART I.

STEAM—DAGUERRETYPE—LIGHTNING CONDUCTORS—THE SAFETY LAMP—ELECTROPLATING AND GILDING—THE ELECTRIC TELEGRAPH.

EACH succeeding age and generation leaves behind it a peculiar character, which stands out in relief upon its annals, and is associated with it for ever in the memory of posterity. One is signalized for the invention of gunpowder, another for that of printing; one is rendered memorable by the revival of letters, another by the reformation of religion; one epoch is rendered illustrious by the discoveries of Newton, another by the conquests of Napoleon. If we are asked by what characteristic the present age will be marked in the records of our successors, we answer, by the miracles which have been wrought in the subjugation of the powers of the material world to the uses of the human race. In this respect no former epoch can approach to competition with the present.

Although the credit of the invention of the steam-engine must be conceded to the generation which preceded us, its improvement and its most important applications are unquestionably due to our contemporaries. So little was the immortal Watt himself aware of the extent of the latent powers of that machine, that he declared, upon the occasion of his last visit to Cornwall, on ascertaining that a weight of twenty-seven millions of pounds had been raised one foot high by the combustion of a bushel of coals under one of his boilers, that the *ne plus ultra* was attained, and that the power of steam could no further go. Nevertheless, the Patriarch of the steam-engine lived to see forty millions of pounds raised the same height by the same quantity of fuel. Had he survived only a few years longer, he would have seen even this performance doubled, and still more recently it has, under favorable circumstances, been increased in a threefold ratio.

But it is not in the mere elevation of min-

eral substances from the crust of the globe, nor in the drainage of the vast subterranean regions which have become the theatre of such extensive operations of industry and art, that steam has wrought its greatest miracles. By its agency coal is made to minister in an infinite variety of ways to the uses of society. Coals are by it taught to spin, weave, dye, print, and dress silks, cottons, woolens, and other cloths; to make paper, and print books on it when made; to convert corn into flour; to press oil from the olive, and wine from the grape; to draw up metal from the bowels of the earth; to pound and smelt it, to melt and mould it; to forge it; to roll it, and to fashion it into every form that the most wayward caprice can desire. Do we traverse the deep?—they lend wings to the ship, and bid defiance to the natural opponents, the winds and the tides. Does the wind-bound ship desire to get out of port to start on her voyage?—steam throws its arms round her, and places her on the open sea. Do we traverse the land?—steam is harnessed to our chariot, and we outstrip the flight of the swiftest bird, and equal the fury of the tempest.

It results, from the official returns of the Cornish authorities, that as much power is there obtained from a bushel of coals, as is equivalent to the average day's work of a hundred stage-coach horses.

The great pyramid of Egypt stands upon a base measuring seven hundred feet each way, and is five hundred feet high. According to Herodotus, its construction employed a hundred thousand laborers for twenty years. Now we know that the materials of this structure might be raised from the ground to their present position by the combustion of four hundred and eighty tons of coals.

The Menai Bridge consists of about two thousand tons of iron, and its height above the level of the water is one hundred and twenty feet. Its entire mass might be lifted from the level of the water to its present

position by the combustion of four bushels of coal!

Marvelous as the uses are to which heat has been rendered subservient, those which have been obtained from light are not less so. Ready-made flame is fabricated in vast establishments, erected in the suburbs of cities and towns, and transmitted in subterranean pipes through the streets and buildings which it is desired to illuminate. It is supplied, according to individual wants, in measured quantity; and at every door an automaton is stationed, by whom a faithful register is kept of the quantity of flame supplied from hour to hour!

It resulted from scientific researches on the properties of solar light, that certain metallic preparations were affected in a peculiar manner by being exposed to various degrees of light and shade. This hint was not lost. An individual, whose name has since become memorable, M. Daguerre, thought that as engraving consisted of nothing but the representation of objects by means of incisions on a metallic plate, corresponding to the lights and shades of the object represented—and as these same lights and shades were shown by the discoveries of science to produce on the metals specific effects, in the proportion of their intensities—there could be no reason why the objects to be represented should not be made to *engrave themselves* on plates properly prepared!! Hence arose the beautiful art now become so universally useful, and called after its inventor—DAGUERREOTYPE.

The object of which it is desired to produce a representation, is placed before an optical instrument, with which every one is familiar as the camera-obscura. An exact representation of it, on a scale reduced in any required proportion, is thus formed upon a plate of ground glass, so that it may be viewed by the operator, who can thus adjust the instrument in such a manner as to obtain an exact picture of it. If it be desired to make a portrait, the effect of the posture of the sitter can thus be seen, and the most favorable position ascertained before the process is commenced.

When these arrangements have been made, the plate of ground glass, on which the picture was previously formed, is withdrawn, and the metallic plate, on which the picture is to be engraved, is substituted for it. This latter being placed in the groove from which the plate of ground glass has been withdrawn, the picture will be formed upon it with the same degree of precision, and in

exactly the same position in which it was previously seen on the plate of ground glass.

When the light is favorable, four or five seconds are sufficient to complete the process. According as it is less intense, the necessary time may be greater, but never should exceed a minute. In general, the shorter the time in which a picture is made, the more perfect the picture will be, especially if it be a portrait, because the defects of the representation most commonly arise from the object represented, or some part of it, having shifted its position during the process. In that case, the picture presents the object as though it were seen through a mist. The best portraits we have ever seen produced by this art have been completed in four seconds!

It might be supposed, from what we have here said, that it would be almost impossible, in any case, to obtain a perfect representation of the eyes in a portrait, because of the difficulty of abstaining from winking. It happens, however, that winking being a change of position which is only continued for an inappreciable instant of time, the eye resuming its position immediately, is almost the only movement incidental to a sitter which does not affect the precision of the portrait; unless, indeed, the action of winking were to be continued in rapid succession, which, in practice, almost never occurs.

One of the defects of Daguerreotype, as applied to portraiture, arises from the impossibility of bringing the entire person of the sitter at once into focus. To render this possible, it would be necessary that every part of the person of the sitter should be at precisely the same distance from the lens of the camera obscura, a condition which obviously cannot be fulfilled. It happens, consequently, that those parts of the person of the sitter which are nearest to the lens, will be represented on a scale a little greater than those parts which are most distant; and if the instrument be adjusted so as to bring the nearer parts into very exact focus, the more distant parts will be proportionally out of focus.

These defects cannot be removed, but may be so much mitigated as to be imperceptible. By using larger lenses, the camera can be placed at a considerable distance from the sitter, and without inconveniently diminishing the size of the picture. By this expedient, the difference between the distances of different points of the sitter from the lens, will bear so small a proportion to the whole

distance, that the amount of distortion arising from the cause just mentioned may be rendered quite imperceptible. Large lenses, however, when good in quality, are expensive; and it is only the more extensively-employed practitioners in this business that can afford to use them.

The magnitude of these pictures will, in a great degree, depend on the magnitude of the lens. We have seen, lately, groups executed by a Parisian artist, on plates from fifteen to sixteen inches square.*

The agency of light and shade has been successfully used, in the same manner, to produce pictures on paper, glass, wood, and other substances, chemically prepared, so as to be more or less impressed with some dark color. The representations obtained in this manner have not, however, the precision and distinctness which are so universally characteristic of the Daguerreotype process.

Attempts have been recently made, with more or less success, to remove the metallic or *leaden* hue which has been found disagreeable in Daguerreotype portraits. This is effected by coloring them by means of dry colors rubbed into the incisions made by the action of the light. These colored Daguerreotypes, though more open to objection on artistical grounds, are, nevertheless, decidedly popular, when judiciously executed.

Artists, and especially miniature-painters, are naturally opposed to Daguerreotype. No miniature, however, will, so far as relates to mere resemblance, bear comparison to a Daguerreotype. *The artist* can soften down defects, and present the sitter under the most favorable aspect. *The sun*, however, is no flatterer, and gives the lineaments as they exist, with the most inexorable fidelity, and the most cruel precision.

Nevertheless, it is known that some of the most eminent portrait-painters—those whose productions have raised them above petty feelings—do avail themselves of the aid of Daguerreotypes, where well-executed representations of that kind are obtainable; and they see in this no more degradation of their art, than a sculptor finds in using a *cast* of the subject which his chisel is about to reproduce.

But of all the gifts which Science has presented to Art in these latter days, the most striking and magnificent are those in which the agency of electricity has been evoked.

* The most successful practitioner in Daguerreotype now in Paris is Mr. W. Thompson, an American.

From the moment electric phenomena attracted the attention of the scientific world, the means of applying them to the useful purposes of life were eagerly sought for. Although such applications had not yet entered into the spirit of the age as fully as they have since done, it so happened that, in this department of physics, a volunteer had enlisted in the army of science, the characteristic of whose genius was eminently practical, and soon achieved, by his discoveries, an eminence to which the world has since offered universal homage. Benjamin Franklin, a member of a literary society in Philadelphia, had his attention called to the then recent discovery, the phenomena of the Leyden Jar, which at that time astonished all Europe. From that moment the views of Franklin were bent on the discovery of some useful purpose to which these discoveries could be applied. *Cui bono?* was a question never absent from his thoughts. After having made some of those great discoveries which have since formed the basis of electrical science, and have surrounded his name with unfading lustre, he expressed, in a letter to the secretary of the Royal Society of London, in his usual playful manner, his disappointment at not being yet able to find any application of the science beneficial to mankind:—

“Chagrined a little,” he wrote, “that we have hitherto been able to produce nothing in the way of use to mankind; and the hot weather coming on, when electrical experiments are not so agreeable, it is proposed to put an end to them for the season, somewhat humorously, in a party of pleasure, on the banks of the Schuylkill.* Spirits, at the same time, are to be fired by a spark sent from side to side, through the river, without any other conductor than the water; an experiment which we some time since performed to the amazement of many.† A turkey is to be killed for dinner by the electrical shock, and roasted by the electrical jack,‡ before a fire kindled by the electrical bottle” (since known as the Leyden vial), “when the healths of all the

* A picturesque river which washes the Western suburbs of Philadelphia, and to the valley of which it is the custom of the citizens to make picnic parties. In the summer months, the temperature at Philadelphia is so high as to banish to the watering-places all who are not absolutely tied to the town by the exigencies of their business.

† This experiment has been recently reproduced in the investigations connected with the electric telegraph, but without giving credit to Franklin as its original author.

‡ It will be seen by this hint that the idea of applying electricity, as a moving power, had already occurred to Franklin.

famous electricians in England, Holland, France, and Germany, are to be drunk in electrified bumpers, under the discharge of guns from the electrical battery.”*

Although the application of the great principles of science to the practical uses of life cannot be too highly appreciated, it would be a great error to carry this enthusiasm for the useful to such an excess as to exclude a just admiration for those high abstract laws, the discovery of which had conferred lustre on the names of our greatest philosophers, and on none more justly than that of Franklin himself. It must be admitted, however, that this craving after utility was the great characteristic of his mind, and may even be regarded as having been carried almost to a fault. It has been justly observed by a contemporary writer—

“That although the application of the properties of matter and the phenomena of nature to the uses of civilized life is undoubtedly *one* of the great incentives to the investigation of the laws of the material world, yet it is assuredly a great error to regard that either as the only or the principal motive to such inquiries. There is in the perception of truth itself—in the contemplation of connected propositions, leading by the mere operation of the intellectual faculties, exercised on individual physical facts, to the development of those great general laws by which the universe is maintained—an exalted pleasure, compared with which the mere attainment of convenience and utility in the economy of life is poor and mean. There is a nobleness in the power which the natural philosopher derives from the discovery of these laws, of raising the curtain of futurity and displaying the decrees of nature, so far as they affect the physical universe for countless ages to come, which is independent of, and above all, utility. While, however, we thus claim for truth and knowledge all the consideration to which, on their own account, they are entitled, let us not be misunderstood as disparaging the great benefactors of the human race, who have drawn from them those benefits which so much tend to the well-being of man. When we express the enjoyment which arises from the beauty and fragrance of the flower, we do not the less prize the honey which is extracted from it, or the medicinal virtues which it yields. That Franklin was accessible to such feelings, the enthusiasm with which he expresses himself throughout his writings, in regard to natural phenomena, abundantly proves. Nevertheless, *useful application* was undoubtedly ever uppermost in his thoughts; and he probably never witnessed a physical fact, or considered for a moment any law of nature, without inwardly proposing to himself the question, ‘In what way

can this be made beneficial in the economy of life?’”*

After studying the properties of metals, in virtue of which electricity runs along them in preference to other substances, and discovering the property of points to attract the electric fluid, Franklin proceeded at once to the discovery of conductors, or “lightning-rods,” for the protection of buildings. “If these things be so,” wrote he—

“May not the knowledge of this power of points be of use to mankind in preserving houses, churches, ships, &c., from the stroke of lightning, by directing us to fix on the highest points of those edifices, upright rods of iron made sharp as a needle, and gilt (at the points) to prevent rusting; and from the foot of those rods a wire down the outside of the building into the ground, or down round one of the shrouds of a ship, and down her side till it reaches the water? Would not these pointed rods probably draw the electric fire out of a cloud before it came nigh enough to strike, and thereby secure us from that most sudden and terrible mischief?”†

It is known to every one, that after this Franklin established his theory by the celebrated experiment of the kite, by which he literally drained a cloud of its lightning; but what is not so well known is, that when the paper written by Franklin, explaining his project of constructing lightning-conductors for the protection of buildings, was soon afterward read before the Royal Society of London, it was received with peals of laughter, and was voted so absurd as to be deemed unworthy of being printed in the “Philosophical Transactions.” It *was*, however, printed by an independent publisher, and has attained, as is well known, a world-wide celebrity.

Not long afterward, the same members of the Royal Society, who laughed at Franklin’s project, were called upon to superintend the erection of conductors upon the royal palace, when, to gratify the royal spleen against the rebellious philosopher of the revolted colonies, they rejected the *pointed conductors* recommended by Franklin, and actually caused *blunt conductors* to be placed on the palace. Franklin, who held the office of American Minister in London (the independence of the United States being then recently acknowledged), on hearing this, wrote to one of his friends in Philadelphia:—

* “Lardner on Electricity and Magnetism,” vol. i. p. 41.

† “Franklin’s Works,” vol. v. p. 235. Boston: 1837.

* Franklin’s Works, vol. v. p. 210. Boston: 1837.

"The king's changing his *pointed* conductors for *blunt* ones is a matter of small importance to me. If I had a wish about them it would be, that he would reject them altogether as ineffectual. For it is only since he thought himself and his family safe from the thunder of heaven that he has dared to use his own thunder in destroying his innocent subjects."*

Art often presses into its service the discoveries of Science, but it sometimes provokes them. Art surveys the fruit of the toil of the philosopher, and selects such as suits her purposes; but sometimes, not finding what is suitable to her wants, she makes an appeal to Science, whose votaries direct their researches accordingly toward the desired object, and rarely fail to attain them.

One of the most signal examples of the successful issue of such an appeal presents itself in the *safety-lamp*.

The same gas which is used for the purposes of illumination of our cities and towns (and which, as is well known, is obtained from coals by the process of baking in close retorts) is often spontaneously developed in the seams of coal which form the mines, and collects in large quantities in the galleries and workings where the coal-miners are employed. When this gas is mingled with common air, in a certain definite proportion, the moisture becomes highly explosive, and frequently catastrophies, attended with frightful loss of life, occurred in consequence of this in the mines. The prevalence of this evil at length became so great, that government called the attention of scientific men to the subject, and the late Sir Humphrey Davy engaged in a series of experimental researches with a view to the discovery of some efficient protection for the miner, the result of which was, the now celebrated safety-lamp.

Davy first directed his inquiries to the nature and properties of flame. What is flame? was a question which seems until then never to have been answered or even asked.

All known bodies, when heated to a certain intensity, become luminous. Thus iron, when its temperature is elevated first, gives a dull red light, which becomes more and more white as the temperature is increased, until at length it becomes as white as the sun. Davy showed that gaseous substances are not exempt from this law, and that flame is nothing more than *gas rendered white hot*.

He further showed that if the gas thus rendered white hot be cooled, it will cease to

be luminous in the same manner, and from the same cause as would be the case with a red hot poker plunged in water.

He showed that the gas which forms flame may be cooled by putting it in contact with any substance, such as metal, which, being a good conductor, would deprive it of so much of its caloric that it must cease to be luminous.

Thus, if a piece of wire net-work, with meshes sufficiently close, be held over the flame of a lamp or candle, it will be found that the flame will not pass through the meshes. The wire will become red hot, but no flame will appear above it.

It is not, in this case, that the gas which forms the flame does not pass through the meshes of the wire, but in doing so, it gives up so much of its heat to the metal, that when it escapes from the meshes above the wire, it is no longer hot enough to be luminous.

Sir Humphrey Davy, in the researches which he was called to make, discovered this important fact, which enabled him to explain the nature and properties of flame; and having so discovered it, he did not fail promptly to apply it to the solution of the practical problem with which he had to grapple.

This problem was to enable the miner to walk, lamp in hand, through an atmosphere of high explosive gas, without the possibility of producing explosion. It was, as though he were required to thrust a blazing torch through a mass of gunpowder without either extinguishing the flambeau or igniting the powder; with this difference, however, that the gaseous atmosphere to which the miner was often exposed was infinitely more explosive than gunpowder.

The instrument by which he accomplished this was as remarkable for its simplicity as for its perfect efficiency. A common lantern, containing a lamp or candle, instead of being as usual enclosed by glass or horn, was enclosed by wire gauze of that degree of fineness in its meshes which experiment had proved to be impervious to flame. When such a lantern was carried into an atmosphere of explosive gas, the external atmosphere would enter freely through the wire gauze, and would burn quietly within the lantern; but the meshes which thus permitted the cold gas to enter, forbid the white-hot gas within to escape without parting with so much of its heat in the transit as to deprive it of the character and properties of flame; so that, although it passed into the external explosive atmosphere, it was no longer in a condition to inflame it.

* "Franklin's Works," vol. v. p. 227.

The lamp thus serves a double purpose: it is at once a *protection* and a *warning*. It protects, because the flame within cannot ignite the gas outside the lantern. It warns, because the miner, seeing the gas burning within the lantern, is informed that he is enveloped by an explosive atmosphere, and takes measures accordingly to ventilate the gallery, and meanwhile to prevent unguarded lights from entering it.

Nothing can be imagined more triumphantly successful than this investigation of Sir Humphrey Davy. Some philosophers have the good fortune to arrive at great scientific discoveries in the prosecution of those researches to which the course of their labors leads them. Some are so happy as to make inventions of high importance in the arts, when such applications are suggested by the laws which govern the phenomena that have arisen in their experimental researches. But we cannot remember any other instance in which an object of research being proposed to an experimental philosopher, foreign to his habitual inquiries, having no associations with those trains of thought in which his mind has been previously involved, he has prosecuted the inquiry so as to arrive not only at the development of a natural law of the highest order, the fruitful parent of innumerable consequences of great general importance in physics, but has at the same time realized an invention of such immense utility as to form an epoch in the history of art, and to become the means of saving countless numbers of human lives.

As wire-gauze drains flame of its danger in the safety-lamp, it drains air of its poison by another felicitous application of a physical principle in the case of the needle-grinder's mask. In that department of industry, the health of the artisan was impaired, and the duration of his life abridged, by respiring continually, while at work, an atmosphere impregnated with steel-dust. A mask was invented composed of a gauze formed of magnetized wire, through which the artisan was to breathe. The air, in passing from the external atmosphere to the mouth and nostrils, left all the steel-dust which it held in suspension on the wire of the mask, from which, from time to time, it was wiped off as its accumulated.

Electricity has proved a fertile source of benefits conferred on Art by Science. When a galvanic current is passed through a fluid which holds in solution any substance which has the property of being attracted by one of the poles of the battery, such substance

will desert the fluid, and collect upon any object, being a conductor, which may be used to form the attracting-pole.

This fact has been already variously applied in the arts, and in no case with greater felicity and success than in the process of gilding and silvering the baser metals.

The process of electro-gilding or plating, which now forms so important a department of industrial art, is easily described.

Let us suppose that it be required to gild an object formed of silver, copper, or any inferior metal. The object, being first fabricated in the form it is destined to have, is submerged in a fluid which holds gold in solution. It is then put in connection with the attracting pole of the galvanic battery, while the solution of gold is put in connection with the other pole. The galvanic current thus passing through the solution, will decompose it, and the gold will attach itself to the metallic object, which, in a few seconds, will be sensibly gilt.

Any quantity of gold which may be desired, can thus be deposited on the surface of the object. This is accomplished merely by allowing it to remain for a longer period of time in the solution. Thus the gilding may be regulated with the utmost precision, and the quantity of gold which has been deposited over the object to be gilt may always be known with perfect exactitude.

An object may be silvered in some parts, and gilt in others, by a very simple expedient. Let the parts intended to be gilt be coated with some non-conducting substance, not affected by the solution of silver, and let the object be then immersed in the solution, and put in connection with the galvanic battery, as already described. The parts not coated will then be plated. Let the parts thus plated be now coated with a non-conducting substance not affected by the solution of gold, the coating previously applied being removed, and let the object be immersed in the solution of gold, and being connected with the battery, the parts not coated will be gilt.

The result of the two operations will be, that the object will be plated on some parts, and gilt on others.

In this manner, beautiful effects are produced on vessels used for domestic purposes, which are adorned with various designs expressed by such combinations of plating and gilding.

But of all the applications of electric agency to the uses of life, that which is transcendently the most admirable in its effects, and

the most important in its consequences, is the electric telegraph. No force of habit, however long continued, no degree of familiarity can efface the sense of wonder which the effects of this most marvelous application of science excites. If any sanguine and far-seeing votary of science had ventured thirty years ago to prognosticate the events which are now daily and hourly witnessed in the Central Electric Telegraph Office, Lothbury, at the Ministry of the Interior in Paris, or in the Telegraphic Bureau at New York, he would have been pronounced insane by every sober-minded and calmly-judging person.

It is not many weeks since we, being in Paris, entered the Telegraphic Office, at the Ministry of the Interior, in the Rue Grenelle St. Germain. There we found ourselves in a room about twenty feet square, in the presence of some half dozen persons seated at desks, employed in transmitting to, and receiving from various distant points of France, dispatches. Being invited, we dictated a message, consisting of about forty words, addressed to one of the clerks at the railway-station at Valenciennes—a distance of a hundred and sixty-eight miles from Paris. This message was transmitted in two minutes and a half. An interval of about five minutes elapsed, during which, as it afterward appeared, the clerk to whom the message was addressed was sent for. At the expiration of this interval, the telegraph began to express the answer, which, consisting of about thirty-five words, was delivered and written out by the agent at the desk, in my presence, in two minutes. Thus, forty words were sent a hundred and sixty-eight miles, and thirty-five words returned from the same distance, in the short space of four minutes and thirty seconds.

But surprising as this was, we soon afterward witnessed, in the same room, a still more marvelous performance. A memoir on an improvement on the Electric Telegraph, by Mr. Alexander Bain, having been read before the Institute, and submitted to the Committee of the Legislative Assembly appointed to report on the project of law for opening the telegraphs to the use of the public, a series of experiments were ordered to be made, with the purpose of testing this alleged improvement. The Committee, among whom were M. Leverrier (celebrated for having discovered a planet before it was visible), M. Pouillet, professor of physics, and other distinguished persons, desiring to submit the invention to a more severe test as to

distance, than the existing telegraphs supplied the means of accomplishing, adopted the following expedient:—Two telegraphic wires, extending from the Ministry of the Interior to Lille, were united at the latter place, so as to form one continuous wire, extending from the Ministry to Lille, and back from Lille to the Ministry, making a total distance of three hundred and thirty-six miles. This, however, not being deemed sufficient for the purpose, several spiral coils of wire, wrapped in silk, were obtained, measuring in their total length seven hundred and forty-six miles, and were joined to the extremity of the wire returning from Lille, thus making one continued wire measuring one thousand and eighty-two miles. A message consisting of two hundred and eighty-two words was now transmitted from one end of the wire. A pen attached to the other end immediately began to write the message on a sheet of paper, moved under it by a simple mechanism, and the entire message was written in full in the presence of the Committee, each word being spelled completely, and without abridgment, in *fifty-two seconds*, being at the average rate of *two words and four-tenths per second*!

By this instrument, therefore, it is practicable to transmit intelligence to a distance of upward of a thousand miles, at the rate of nineteen thousand five hundred words per hour!

The instrument would, therefore, transmit to a distance of a thousand miles, in the space of an hour, the contents of twenty-six pages of the book now in the hands of the reader!!

But it must not be imagined, because we have here produced an example of the transmission of a dispatch to a distance of a thousand miles, that any augmentation of that distance could cause any delay of practical importance. Assuming the common estimate of the velocity of electricity, the time which actually elapsed in the transition of the dispatch in this case was the two-hundredth part of a second. If, therefore, instead of sending the dispatch along a thousand miles of wire, we had sent it along a wire completely surrounding the globe, the time of its transmission would still be only the *eighth part of a second*.*

Such a dispatch would fly eight times

* We have here taken the usual estimate of the speed of an electric fluid; recent experiments render it probable that it is somewhat less, and depends on the conductivity of the wire. Thus copper and iron give different rates of transmission.

round the earth between the two beats of a common clock, and would be written in full at the place of its destination more rapidly than it could be repeated by word of mouth. When such statements are made, do we not feel disposed to exclaim—

“Are such things here as we do speak about?
Or have we eaten of the insane root,
That makes the reason prisoner?”

The wildest flights of the most exalted imagination would not have dared, even in fiction, to give utterance to these stubborn realities. Shakspeare only ventured to make his fairy

“Put a girdle round the earth
In forty minutes!”

To have encircled it eight times in a second, would have seemed too monstrous, even for Robin Goodfellow.

The curious and intelligent reader of these pages will scarcely be content, after the statement of facts so extraordinary, to remain lost in vacant astonishment at the power of science, without seeking to be informed of the manner in which the phenomena of nature have been thus wonderfully subdued to the uses of man. A very brief exposition will be enough to render intelligible the manner in which these miracles of science are wrought.

The electric telegraph, whatever form it may assume, derives its efficiency from the three following conditions:—

1. A power to develop the electric fluid, continuously, and in the necessary quantity.
2. A power to convey to it any required distance without being injuriously dissipated.
3. A power to cause it, after arriving at such distant point, to make written or printed characters, or some sensible signs, serving the purpose of such characters.

The apparatus used for producing the electric fluid consists of a series of plates of zinc and copper, united in pairs, and placed in a porcelain, or wooden trough. The zinc plates are previously rubbed with mercury, which, combining with the superficial part of the zinc, forms a coating of amalgam, which renders the development of the electricity more regular and uniform. The cells between the successive pairs of plates are filled with dry and perfectly clean sand, which is moistened with a solution consisting of eleven parts of water to one of strong sulphuric acid.*

A series of troughs, thus arranged, are

* Other combinations are occasionally used, but the principle is the same.

called a galvanic battery: and if they be united by metallic connections—the series of plates following the same order, and their extremities being connected by a metallic bar or wire—a continuous current of electricity will be propagated along such bar or wire, from one end of the battery to the other. Batteries of this kind are simple, cheap, steady, and continuous in their effects; their action being maintained during a period of four or five months, no other attention being required than to renew the acid solution from time to time, with which the sand is moistened.

Such an apparatus as that which we have here described, is to the electric telegraph what a boiler is to a steam-engine. It is the generator of the fluid by which the action of the machine is produced and maintained.

We have next to explain how the electric fluid, generated in the apparatus just explained, can be transmitted to a distance without being wasted or dissipated in any injurious degree *en route*.

If tubes or pipes could be constructed with sufficient facility and cheapness, through which the subtle fluid could flow, and which would be capable of confining it during its transit, this object would be attained. As the galvanic battery is analogous to the boiler, such tubes would be analogous in their form and functions to the steam-pipe of a steam-engine.

The construction of such means of transmission has been accomplished by means of two well-known properties of the electric fluid, in virtue of which it is capable of passing freely over a certain class of bodies called *conductors*, while its movement is arrested by another class called *non-conductors*, or *insulators*.

The most conspicuous examples of the former class are the metals; the most remarkable of the latter being resins, wax, glass, porcelain, silk, cotton, &c., &c.

Now, if a rod or wire of metal be coated with wax, resin, silk, cotton, or other *insulator*, the electric fluid will pass freely along the metal, in virtue of its character of a conductor; and its escape from the metal to any lateral object will be prevented by the coating, in virtue of its character of an insulator.

The insulator in such cases is, so far as relates to the electricity, a real tube, inasmuch as the electric fluid passes through the metal included by the coating, in exactly the same manner as water or gas passes through the pipes which conduct it; with this difference, however, that the electric fluid moves along

the wire more freely, in an almost infinite proportion, than does either water or gas in the tubes which conduct them.

If, then, a wire, coated with a non-conducting substance, capable of resisting the vicissitudes of weather, were extended between any two distant points, one end of it being attached to one of the extremities of a galvanic battery, a stream of electricity would pass along the wire—*provided the other end of the wire were connected by a conductor with the other extremity of the battery.*

To fulfill this last condition, it was usual, when the electric telegraphs were first erected, to have a second wire extended from the distant point back to the battery in which the electricity was generated. But it was afterward discovered that the EARTH ITSELF was the best and by far the cheapest and most convenient conductor which could be used for this returning stream of electricity. Instead, therefore, of a second wire, the extremity of the first, at the distant point to which the current is sent, is attached to a large metallic plate, measuring five or six square feet, which is buried in the earth. A similar plate, connected with the other extremity of the battery, at the station from which the current is transmitted, is likewise buried in the earth, and it is found that the returning current finds its way back through the earth from the one buried plate to the other buried plate.

Of all the miracles of science, surely this is the most marvelous. A stream of electric fluid has its source in the cellars of the Central Electric Telegraph Office, Lothbury, London. It flows under the streets of the great metropolis, and, passing along a zig-zag series of railways, reaches Edinburgh, where it dips into the earth, and diffuses itself upon the buried plate. From that it takes flight through the crust of the earth, and *finds its own way* back to the cellars at Lothbury!!

Instead of burying plates of metal, it would be sufficient to connect the wires at each end with the gas or water-pipes which, being conductors, would equally convey the fluid to the earth; and in this case, every telegraphic dispatch which flies to Edinburgh along the wires which border the railways, would fly back, rushing to the gas-pipes which illuminate Edinburgh—from them through the crust of the earth to the gas-pipes which illuminate London, and from them home to the batteries in the cellars at Lothbury.

The atmosphere, when dry, is a good non-conductor; but this quality is impaired when

it is moist. In ordinary weather, however, the air being a sufficiently good non-conductor, a metallic wire will, without any other insulating envelope except the air itself, conduct the stream of electricity to the necessary distances. It is true that a coated wire, such as we have already described, would be subject to less waste of the electric fluid *en route*; but it is more economical to provide batteries sufficiently powerful to bear this waste, than to cover such extensive lengths of wire with cotton, or any other envelope.

The manner in which the conducting wires are carried from station to station is well known. Every railway traveler is familiar with the lines of wire extended along the side of the railways, which, when numerous, have been not unaptly compared to the series of lines on which the notes of music are written, and which are the metallic wires on which invisible messages are flying continually with a speed that surpasses imagination. These wires, in the case of the English telegraphs, are galvanized so as to resist oxidation, and are of sufficient thickness to bear the tension to which they are submitted. They are suspended on posts, erected at intervals of sixty yards, being at the rate of thirty to a mile. These posts, therefore, supply incidentally a convenient means by which a passenger can ascertain the speed of the train in which he travels. If he count the number of telegraph posts which pass his eye in two minutes, that number will express in miles per hour the speed of the train.

To each of these poles are attached as many tubes or rollers of porcelain or glass as there are wires to be supported. Each wire passes through a tube, or is supported on a roller; and the material of the tubes or rollers being among the most perfect of the class of non-conducting substances, the escape of the electricity at the points of contact is impeded.

Notwithstanding these precautions, a considerable escape of electricity still takes place in wet weather. The coat of moisture which collects on the wire, the tube or roller, and the post being a conductor, carries away more or less of the fluid. Consequently, more powerful batteries are necessary to give effect to the telegraph in wet than in dry weather.

In England, and on the Continent, the material used for the supports of the wires is porcelain. In the United States it is glass, which is a more perfect insulator. In England the supports are tubes—on the Continent and in America they are rollers.

In some cases, as for example in the streets of London, it is found inconvenient to carry the wires elevated on posts, as here described. In such cases other methods are adopted.

The wires proceeding from the central telegraph station in London are wrapped with cotton thread, and coated with a mixture of tar, resin, and grease. This coating forms a perfect insulator. Nine of these wires are then packed in a half-inch leaden in-pipe, and four or five such pipes are packed in an iron pipe about three inches in diameter. These iron pipes are then laid under the foot pavements, along the sides of the streets, and are thus conducted to the terminal stations of the various railways, where they are united to the lines of wire supported on posts along the sides of the railways, already described.

Provisions, called *testing-posts*, are made at intervals of a quarter of a mile along the streets, by which any failure or accidental irregularity in the buried wires can be ascertained, and the place of such defect always known within a quarter of a mile.

In Prussia, and one or two other continental states, the system of subterranean conducting-wires is exclusively adopted, not only in cities, but generally along the entire telegraphic lines.

In France, on the other hand, and in the United States, the wires, even in the cities and towns, are conducted on rollers at an elevation, as on other parts of the lines. In Paris, for example, the telegraphic wires proceeding from the several railway stations are carried round the external boulevards and along the quays, the rollers being attached either to posts, or to the walls of houses or buildings, and are thus carried to the central station at the Ministry of the Interior.

In Europe, the telegraphic wires invariably follow the course of railways, and this circumstance has led some to conclude that, but for the railways, the electric telegraph would be an unprofitable project.

This, however, is a mistake. In the United States, where a much greater extent of electric telegraph has been erected and brought into operation than in Europe, the wires do not follow the course of the railways. They are conducted, generally, along the sides of the common coach-roads, and sometimes even through tracts of country where no roads have been made.

It is contended in Europe that the wires would not be safe, unless placed within the railway fences. The reply to this is, that

they are found to be safe in the United States, where there is a much less efficient police, even in the neighborhood of towns, and in most places no police at all. It may be observed, that the same apprehensions of the destructive propensities of the people have been advanced upon first proposing most of the great improvements which have signalized the present age. Thus, when railways were projected, it was objected that mischievous individuals would be continually tearing up the rails, and throwing obstructions on the road, which would render traveling so dangerous, that the system would become impracticable.

When gas-lighting was proposed, it was objected that evil-disposed persons would be constantly cutting or breaking the pipes, and thus throwing whole towns into darkness.

Experience, nevertheless, has proved these apprehensions groundless; and certainly the result of the operations on the electric telegraph in the United States goes to establish the total inutility of confining the course of the wires to railways. Those who have been practically conversant with the system, both in Europe and in America, go further, and even maintain that the telegraph is subject to less inconvenience, and that accidental defects are more easily made good, and that an efficient superintendence is more easily insured on common roads, according to the American system, than on railways according to the European system. Our limits, however, preclude us from entering into all the details of this question.

Nothing in the history of the influence of the arts on social progress presents a more curious subject of reflection than do these systems of metallic wire passing under our feet as we walk the streets, and beside us as we traverse the railways.

"In our metropolis," observes a lively cotemporary, "there is scarcely a street which does not appear to take pride in exposing, as often as possible, to the public view, a series of pipes of all sizes, in which fire of various companies, pure water of various companies, and unmentionable mixtures, common to all, pass cheek by jowl with infinitely less trouble than the motley human currents flow above them. But among all the subterranean pipes laid bare before us, there is certainly no one which has more curious contents than the three-inch iron pipe of the electric telegraph company; and yet, of all the multitudes who walk the streets, how few of them ever care to reflect what a singular contrast exists between the slow pace at which they themselves are proceeding, and the rate at which, beneath their feet, forty-five electric wires are transmitting in all directions, and to a variety of distances, intelligence of every possible description!"

"How singular it is to reflect, that within the narrow space of the three-inch iron pipe which encases them, notice of a murder is flying to the London papers, passing news from India going into the country; along another wire an officer is applying for his regimentals, while others are conducting to and fro the 'price of stocks,' 'news of the Pope,' a speech from Paris of the collapsed poet," &c. &c. &c.

In case, from the abrasion of the cotton that surrounds the numerous copper wires within the pipe, any of them come into contact with each other, the intelligence which each is conveying is suddenly confounded; in which case other wires must instantly be substituted. Indeed, even as regards the strong galvanized iron wires which in the open air run parallel to our arterial railways, if in wet weather, in spite of the many ingenious precautions taken, the rain should form a continuous stream between the several wires and the ground, the electric fluid, escaping from the wires, is conducted by the water till it finds earth, the best of all conductors; and, therefore, instead of the intelligence going on, say to Edinburgh, it follows the axiom of electricity by selecting the shortest road, and thus completing its circuit through the earth, it returns to London. Sometimes, instead of going to earth, it flies back to the office in London, along another wire, to which, by means of a continuous line of water, or of entanglement of the two wires, it has managed to escape; in which case, the messages on the two wires wrangling with each other, the communication is stopped.

"It is commonly asserted and believed, that many birds are killed by merely perching upon the iron wires of the electric telegraph; but at any time they can do so with perfect impunity. If, indeed, a bird could put one of his feet on the wire, and with the other manage to reach the earth, he would then, no doubt, be severely galvanized. That the railway company's men often pick up under the wires of the electric telegraph, partridges, and other birds, which have evidently been just killed—indeed, some are found with their heads cut off—is quite true; but these deaths and decapitations have proceeded, not from the electricity, but from the birds, probably during twilight or a fog, having at full speed flown against the wires, which, of course, cut their heads off, just as an iron bar would cut off the head of any man, or alderman on horseback, who at a full gallop was to run foul of it.

"In windy weather, the electric wires form an Æolian harp, which occasionally emits most unearthly music. '*I say, Jack!*' said an engine-driver to his stoker, who like himself was listening for the first time to this querulous sort of noise,

proceeding from the newly-erected wires along his line, '*I say, Jack! ain't they a-giving it to them at Threapstone?*'

"When the posts and wires of the electric telegraph between Northampton and Peterborough were being erected, an honest farmer, who for many minutes had been very attentively watching the operation, inquired of the chief superintendent to what use it was to be applied? On being told that by its means he would in a few minutes receive at *Willingborough* a list of the *Mark-lane* prices in *London*, he evidently incredulously asked how that was to be done?—and on its being explained to him that the intelligence would be sent down to him *letter by letter*, he exclaimed, '*But you don't mean to say that besides letters it will bring down parcels too?*'"

But to return to the admirable means whereby those extraordinary effects are produced, and to answer the worthy farmer's inquiry somewhat more intelligibly, let us now see how the electric current which flows along the conducting-wires is made to speak, to make dumb signs, or to write the dispatch when it arrives at its destination.

There are a great variety of properties of the electric current which supply means of accomplishing this.

If the electric current can be made to affect any object in such a manner as to cause such object to produce any effect sensible to the eye, the ear, or the touch, such effect may be used as a *sign*; and if this effect be capable of being *varied*, each distinct *variety* of which it is susceptible may be adopted as a *distinct sign*. Such signs may then be taken as signifying the letters of the alphabet, the digits composing numbers, or such single words as are of most frequent occurrence.

The rapidity and precision of the communication will depend on the rate at which such signs can be produced in succession, and on the certainty and accuracy with which their appearance at the place of destination will follow the action of the producing cause at the station from which the dispatch is transmitted.

These preliminaries being understood, it remains to show what effects of the electric current are available for this purpose.

These effects are:—

I. The power of the electric current to deflect a magnetic needle from its position of rest.

II. The power of the current to impart temporary magnetism to soft iron.

* "*Stokers and Pokers.*" By the Author of "*Bubbles from the Brunnens of Nassau,*" pp. 125-7.

III. The power of the current to decompose certain chemical solutions.

We shall now briefly show the manner in which these properties supply signals sufficiently varied for telegraphic purposes.

1. To explain the deflection of a magnetic needle, let us suppose a copper wire extended over the magnetic needle of a common compass, so that the direction of the wire shall be parallel to the needle, without touching it. In this state of things, the needle will remain undisturbed; but if we send an electric current along the wire, which may be done by connecting the ends of the wire with those of a galvanic battery, the needle will instantly throw itself at right angles to the wire, and will remain in that position so long as the galvanic current is maintained; but if that current be discontinued, by withdrawing either end of the wire from the trough, the needle will instantly resume its position of rest.

It is found, also, that the north pole of the needle will turn, in this case, in one direction or in the other, according to the direction given to the galvanic current. If this current flow in one direction, the north pole will throw itself to the east, and the south to the west; if it flow in the contrary direction, the north pole will be thrown to the west, and the south pole to the east.

2. To explain the sudden conversion of iron into a magnet, and the sudden destruction of the magnetic virtue thus imparted, let us suppose a copper wire to be coiled round a piece of soft iron spirally, so that the successive coils shall not touch each other nor touch the iron, which may be done by coating the wire with silk, or any resinous or non-conducting substance. This being done, let us suppose that an electric current is transmitted through the wire, so that it shall flow spirally round the rod of soft iron, which may be effected by placing, as before, the ends of the wire in a galvanic trough. If steel filings, a needle, or any light piece of iron, be brought near the rod or iron thus circumstanced, they will instantly be attracted by it, showing that it has acquired the magnetic virtue; and this effect will continue to be produced so long as the galvanic current shall be maintained along the spiral wire; but the instant that the end of the wire is withdrawn from the galvanic trough, the magnetic virtue deserts the iron, and it will no longer attract.

3. If a sheet of paper, moistened with a chemical solution which is capable of decomposition by the galvanic current, be laid upon

a metallic plate, which is in connection with one end of the battery, and the point of a wire in connection with the other end of the battery, be brought into contact with the paper, a decomposition will take place, and a change of color will be produced upon the paper under the point of the wire, just as if a dot were made upon it by a pen charged with colored ink. If the wire be moved upon the paper, a colored line will be traced; and if the point of the wire be moved as a pen or pencil might be, any characters may be thus written on the paper as they would be with a pen charged with colored ink, similarly moved. If in this case the current be discontinued during any intervals, the wire, though still in contact with the paper, will leave no trace or dot.

To render intelligible the means whereby these three properties have been made instrumental to the transmission of intelligence to a distance—

We have explained how a magnetic needle over which an electric current passes will be deflected to the right or to the left, according to the direction given to the current. Now, it is always easy to give the current the one direction or the other, or to suspend it altogether, by merely changing the ends of the galvanic trough with which the wires are connected, or by breaking the contact altogether.

A person, therefore, in London, having command over the end of a wire which extends to Edinburgh, and is there connected with a magnetic needle, in the manner already described, can deflect that needle to the right or to the left at will.

Thus a single wire and a magnetic needle are capable of making at least two signals.

But signals, whatever be the form of the telegraph used, may be multiplied by repetition and combination. Thus the operator at London may make the needle at Edinburgh move twice successively to the left, and this may be conventionally settled as a sign, independently of that which is produced by a single movement to the left. In like manner, two successive movements to the right will supply another signal; and thus we have four independent signals.

But from these four signals we may immediately produce four more, as we may combine one movement to the right with two to the left, and *vice versa*; and one to the left with two to the right, and *vice versa*; and thus we would have eight independent signals.

We may carry this method further, and so arrange the system that three successive

movements to the right and three successive movements to the left shall have independent significations; and these again may be combined with each of the eight signals already explained; and, in short, we may carry this system to an extent which shall be limited only by the inconvenience of the delay which would take place in making the repetitions necessary for such signal.

Subject to this delay, however, it is clear that with a single machine we may easily obtain expressions for all the letters of the alphabet and the ten numerals.

But to obviate the inconvenience which would attend multiplied repetitions in the movements of a single needle, we may provide two independent wires, which shall act upon two independent needles.

Each of these needles primarily will afford two independent signals by their movements right and left. These four signals may be combined in pairs, so as to afford four other signals producible by a single movement. Thus, simultaneously with the right-hand movement of one needle we may produce the right-hand movement of the other. In the same way we may simultaneously produce the left-hand movement of both, or the right-hand of either combined with the left-hand movement of the other, which would give eight independent signals, the production of each of which would occupy no more time than that of a single movement. We may then adapt the signals by double movement of each needle, which, combined with each other, and with the single movements, will afford another set of combinations; and by combining these systems, we may obviously obtain all the signals requisite to express the letters and numerals.

Such is, in general, the nature of the signals adopted in the electric telegraphs in ordinary use in England, and in some other parts of Europe.

It may aid the conception of the mode of operation and communication if we assimilate the apparatus to the dial of a clock with its two hands. Let us suppose that a dial, instead of carrying hands, carried two needles, and that their north poles, when quiescent, both pointed to 12 o'clock.

When the galvanic current is conducted under either of them, the north pole will turn either to 3 o'clock or to nine 9 o'clock, according to the direction given to the current.

Now, it is easy to imagine a person in London governing the hands of such a clock erected in Edinburgh, where their indications

might be interpreted according to a way previously agreed upon. Thus, we may suppose that when the needle No. 1. turns to 9, the letter A is expressed; if it turns to 3, the letter B is expressed. If the needle No. 2. turn to 9 o'clock, the letter C is expressed; if it turn to 3, the letter D. If both needles are turned to 9, the letter E is expressed; if both to 3, the letter F. If No. 1. be turned to 9, and No. 2. to 3, the letter G is expressed; if No. 2. be turned to 9, and No. 1. to 3, the letter H, and so forth.

It may be presumed that there can be but little difficulty in conceiving how, by practice, two persons may communicate with each other by such means, almost, if not altogether, as rapidly as they could write and read.

But a difficulty will doubtless suggest itself to the intelligent and inquisitive reader. It will be asked, whether a sentinel must be kept ever on the watch to observe when a message is coming? for as the hands of our clock do not speak, notice could only be received of a coming message by the incessant vigilance of an observer.

Would it not, however, be admirable if we could attach to this clock a striking apparatus, which should address the ear the moment a message is about to be sent, and which should, as it were, awaken the attention of the person on duty?

Such an expedient has, in fact, been contrived. The person in London who desires to communicate a message to the telegraphic agent at Edinburgh can actually make the clock strike at his will, and thus command attention.

The manner in which this is accomplished is as admirable by its simplicity and efficiency as that which we have just described.

The quality resorted to in this case is the last of those we have mentioned above, namely, the power to impart the magnetic virtue at will to soft iron.

One of the wires conducted from London passes into the chamber of the telegraphic apparatus at Edinburgh, where it is connected with a coil of wire which envelopes a rod of soft iron. The ends of this rod, which has the form of a horse-shoe, are placed in contiguity, but not in contact, with the dent of a striking apparatus like an alarm-bell. When a message is about to be sent from London, this bell-wire is put in communication with the galvanic trough in London. Immediately the subtle fluid flows along the wire and converts the horse-shoe rod at Edinburgh into a powerful magnet.

The attractive power which it thus suddenly receives irresistibly draws toward it the detent of the alarum, and lets go the bell, which continues to ring until the agent of the telegraph at Edinburgh answers the demand of the messenger from London, and tells him he is attentive. Then the London communicator withdraws the galvanic current from the bell-wire, the horse-shoe at Edinburgh is instantly deprived of its magnetic virtue, the detent flies back to its place by the action of a spring, and silences the bell.*

In the practical arrangement of electric telegraphs, constructed on this principle, the magnetic needles are placed vertically and not horizontally, as in the mariner's compass, and they are kept, when not affected by the current, in the vertical position, by laying two needles having their poles at opposite ends, one upon the other, by which means the polarity of the system is neutralized, and then a small excess of weight given to one end of the combined needles is sufficient to keep them in the vertical position, when fixed upon a horizontal axis.

In this manner they are fixed upon the dials already described, being free to turn on their axis when affected by a deflecting force sufficiently strong to overcome the small excess of weight just mentioned.

This is the principle of the telegraph now used generally in England. The entire system, except the lines which follow the course of the South-Eastern Railway, is in the hands of a company incorporated by act of parliament, and who, therefore, hold a virtual monopoly of the chief part of the telegraphic business of the kingdom.† A central station is established in London, in Lothbury, near the Bank of England. The lower part of the building is appropriated to the reception of orders and messages. A person desiring to forward a message to any part of England, connected with London, by the wires, writes his message on a sheet of letter-paper, provided for the purpose, and prepared according to a printed form, having the names and address of the writer, and of the party to whom the message is communicated, in blank spaces assigned to them, together with the date and hour at which the message is dispatched. The answer is received, accompanied by the date and hour at which the message arrived, and at which the answer was dispatched.

* *Railway Economy*, by Dr. Lardner, pp. 352-5.

† A Bill is now before Parliament to incorporate a competing company.

The tariff of charges for transmission of telegraphic messages differs very much, according to the destination of the message, and is not strictly regulated by distance.

It is found that by practice the operators of the telegraphic instruments, constructed on this system, are able to communicate about twenty words per minute, when they work with two needles and two conducting-wires, and at the rate of about eight words per minute when working with a single needle.

Besides the transmission of private dispatches, stations have been established by the company in the chief towns of the kingdom, whence and whither intelligence is transmitted from time to time during the day, so that there is thus kept up a never-ceasing interchange of news over the entire extent of that net-work of wires which has overspread the country. At each of these stations public subscription-rooms have been established, in which are posted from hour to hour as they arrive, during the day, the public news, which are known to be of most interest to the local population, such as the money market, shipping intelligence, sporting intelligence, quotations of the commercial markets at all chief places, and parliamentary and general news.

We take the following description of the routine of business in this department of the Central Telegraphic Office at Lothbury, from a popular author already quoted :

"At seven in the morning the superintendent of the former department obtains all the London morning newspapers, from which he condenses and dispatches to the several electric stations the intelligence he considers most useful to each. The local press of course awaits the arrival, and thus by eight o'clock A. M. a merchant at Manchester receives intelligence which the rails can only bring at a quarter before two, and which cannot by rail reach Edinburgh till half past nine, P. M.

"To Glasgow is transmitted every evening detailed intelligence for immediate insertion in the 'North British Daily Mail,' giving everything of importance that has occurred since the first edition of the London papers. Similar intelligence is dispatched to papers at Hull and Leeds.

"By this rapid transmission of intelligence, the alternations in the prices of the markets at Manchester, &c., &c., being almost simultaneous with those of London, the merchants of the former are saved from being victimized by the latter. It is true that by great exertions prior intelligence may electrically be sent by private message; but as the wary ones cautiously wait for the dispatch of the Telegraph Office, it has but little effect.

"At one o'clock information is sent to all the electric reading-rooms of the London quotations

of funds and shares up to that hour, thus showing the actual prices at which business has been done. The closing prices of the French funds for the day preceding are usually annexed, and the state of the London wind and weather at that hour.

"Early in the morning the instrument boys are to be seen greedily devouring (for, with the curiosity, eagerness, and enthusiasm of youth, they appear to take great interest in their duties) the various matters which from all quarters at once are imparted to them.

"One has just received intelligence by telegraph from Ely, announcing the result of the Lynn election. Another a copy of a 'Moniteur' extraordinary, containing the first message of the President of the French Republic to the President of the National Assembly.

"Another, that 'Stewart's and Hetton's were nineteen and sixpence. Gosforth eighteen shill. Holywell fifteen and sixpence. Hasting Hartley fourteen and ninepence. S Q—market one hundred and fifty one, sold one hundred and three—S Q.

"Market very good—P Q."

"Another, the following characteristic description of the winds and weather of Old England at nine A. M. :—

Places.	Wind.	Weather.
Southampton	W.S.W.	Cloudy.
Gosport	S. E.	"
Portsmouth	S. E.	"
London	E.	Rain.
St. Ives	W.	Very fine.
Cambridge	S. W.	Cloudy.
Newmarket	E.	Cloudy.
Yarmouth	E.	Fine.
Lewestoffe	E.	Stormy.
Norwich	E.	Fine.
Chelmsford	N. E.	Cloudy.
Colchester	S. E.	Fine.
Ipswich	S. E.	Fine.

"The above description of our changeable climate, it occurred to us, would not very incorrectly represent the present political state of Europe.

"During the day telegraphic information flashes upon these boys from the Stock Exchange, informing them of 'prices and closing prices of the funds and principal railway shares. With remarks.'

"From the London cattle market, stating 'the number and quality of beasts, sheep, calves, pigs. Holland beasts, sheep, calves. Danish beasts. With remarks.'

"From the meat market, stating 'the prices of every description of meat, with remarks.'

"Also similar returns from all the other markets we have enumerated.

"As fast as this incongruous mass of intelligence arrives, it is, in the mode already described, transcribed in writing to separate sheets of paper, which are without delay, one after another, lowered down to the superintendent of 'the Intelligence Department,' by whom they are rapidly digested for distribution, either to the whole of the Company's reading-room stations, or for those lines only which any particular species of information may partially interest—such as corn-

markets requiring corn intelligence; seaports, shipping news, &c., &c.

"As quickly as these various dispatches are concocted, the information they respectively contain re-ascends through 'the lift,' or wooden chimney, to the instrument department, from whence it is projected, or rather radiates, to its respective destination; and thus in every one of the Company's reading-rooms throughout the kingdom, there consecutively appears, in what would, until very lately, have been considered magic writing on the walls, the varied information which had only reached London from all points of the compass a few minutes ago!"

It will, however, be asked how dispatches can be transmitted to various stations along the extensive lines of telegraphic communication which have been established, unless a separate and independent wire be appropriated to each station, which would be manifestly impracticable.

The answer is easy: At each station the conducting wire is carried from the main wire through the instrument-room of the station, and *passing through the instrument*, is carried out again, and continued along the line by the posts as usual. It is, therefore, apparent that every message dispatched from any station must affect the instruments at *all the other stations*; and, if desired, can be interpreted and written out at them all. It is, therefore, necessary to provide means by which this needless labor shall not be imposed upon the telegraphic agents, and so that it may be at once known for what station or stations each message is intended.

This is accomplished by the following expedient:—The agent at the station from which the message is dispatched first sends the current along the *bell-wire*. By the means already described, bells are then rung at *all the stations*, and the attention of the agents is called. The name of the station for which the dispatch about to be forwarded is intended, is then transmitted, and appears upon the dials at *all the stations*. The agents at all the stations, except that to which the dispatch is addressed, are then released from future attention, and the agent at the station to which it is addressed interprets the signs as they are successively transmitted, and reduces the message to writing.

It will be seen, therefore, that every message which is dispatched, no matter for what station it is intended, is, in fact, sent to all the stations which the wire passes.

The telegraphs established in England, which alone we have here explained, are constructed on the needle system, that is to say, the signals are made by the deviations

of magnetic needles, from their position of rest produced by electric currents passing around them.

Telegraphs depending on the second and third principles adverted to above, have been brought into extensive use in America, the needle system being in no case adopted.

To explain the construction and operation of telegraphs depending on the power of magnetism on soft iron, by an electric current, let us suppose a small lever formed of steel, and balanced on a point. At one end of this lever let a point be formed, so as to constitute a pencil or style. Under the other end let a horse-shoe of soft iron be placed at such a distance that when it shall receive the magnetic virtue from the electric current, the lever will be drawn to the horse-shoe; and let it be so arranged, that when the horse-shoe shall lose its magnetic virtue, the pencil will fall.

Now suppose that immediately above the pencil is placed a small roller, under which a ribbon of paper passes, which receives a slow progressive motion from the roller. Whenever the pencil is raised by the magnet, its point presses on the paper which moves over it, and if it be kept pressed upon it for any time, a line will be traced. If the pencil be only momentarily brought into contact with the paper, a dot will be produced.

It is clear, then, that if we have the power of keeping the pencil for any determinate time in contact with the paper, or of making it only momentarily touch the paper, we shall be enabled to produce lines and dots in any required succession; and by suspending the action of the pencil, we can leave blank space of any desired length between such combinations of lines and dots.

It is easy, therefore, to imagine how a conventional alphabet may be formed by such combination of lines and dots.

To explain the operation of this system, let us suppose a person at New York desirous of sending a message to New Orleans. A wire of the usual kind connects the two places.

The end at New Orleans is coiled round a horse-shoe magnet. The end at New York can be put in communication with the galvanic trough at the will of the person sending the message. The instant the communication is established, the horse-shoe of soft iron at New Orleans becomes magnetic, it attracts the small lever, and presses the pencil against the paper.

The moment the operator at New York

detaches the wire from the trough, the horse-shoe at New Orleans loses its magnetic power, and the pencil drops from the paper. It is clear, then, that the operator at New York, by putting the wire in contact with the trough, and detaching it, and by maintaining the contact for longer or shorter intervals, can make the pencil at New Orleans act upon the paper, as already described, so as to make upon it dots and lines of determinate length, combined in any manner he may desire, and separated by any desired intervals.

In a word, the operator at New York can write a letter with a pencil and paper which are at New Orleans.

Provisions in such an arrangement are made, so that the motion of the paper does not begin until the message is about to be commenced, and ceases when the message is written. This is easily accomplished by the same principle as has been already described in the case of the bell, which gives notice to the attendant in the European telegraph. The cylinders which conduct the band of paper are moved by wheel-work, and a weight properly regulated. Their motion is imparted by a detent detached by the action of the magnet, and which stops the motion when the magnet loses its virtue.

The third system, called the Electro-chemical telegraph, is also exclusively adopted in the United States, and with the improvement which it has recently received, it exceeds by far in efficiency and power all the other telegraphic arrangements hitherto tried. A memoir on this invention has recently been read before the Academy of Sciences in Paris, of which we shall avail ourselves.

The imperfections of the needle and magnet telegraphs, which this improvement removes, are stated as follows:—

“To deflect the magnetic needle from a position of rest, and still more to impart sufficient magnetic energy to soft iron so as to produce the necessary effects at the stations of arrival, in the systems above mentioned, a galvanic current of a certain force is indispensable. Lines of telegraphic communication being exposed to local and atmospherical vicissitudes, such a force of the current cannot always be secured. This is especially the case when communications are made to a great distance, as, for example, 300 miles and upward.

“Supposing the insulation of the supports of the conducting wire to be perfect, and no accidental disturbances arising from atmospherical influence or local causes to be in operation, the strength of the electric current will, nevertheless, be influenced by mere distance. When the distance is augmented to a certain extent, the cur-

rent may become so enfeebled as to be incapable either of imparting the necessary magnetic power to the soft iron, or of deflecting the needles from their position of rest."

It is then shown that various other causes, such as imperfect insulation, atmospheric vicissitudes, &c., are liable to intercept the action of the needle and magnetic telegraphs; and that they sometimes even destroy the coils of fine wire which are used to affect the magnets.

The inventor of the electro-chemical telegraph, Mr. Alexander Bain, a native of Scotland, and formerly a watchmaker in that country, rejects the use of needles and magnets altogether, and relies exclusively on the chemical effects of the electric current. By this means he shows that he can obtain—

"1st. Greater economy and simplicity in the original construction, and in the permanent maintenance and management of the apparatus;

"2d. Increased celerity and certainty, and less liability to error in the transmission of communications."

The mode of construction and operation of the electro-chemical telegraph is as follows:—

"Let a sheet of writing paper be wetted with a solution of prussiate of potash, to which a little nitric and hydrochloric acid have been added.

"Let a metallic desk be provided, corresponding in magnitude with the sheet of paper, and let this metallic desk be put in communication with a galvanic battery so as to form its negative pole. Let a piece of steel or copper wire, forming a pen, be put in connection with the same battery so as to form its positive pole. Let the sheet of moistened paper be now laid upon the metallic desk, and let the steel or copper point, which forms the positive pole of the battery, be brought into contact with it. The galvanic circuit being thus completed, the current will be established, the solution with which the paper is wetted will be decomposed at the point of contact, and a blue or brown spot will appear. If the pen be now moved upon the paper, the continuous succession of spots will form a blue or brown line, and the pen being moved in any manner upon the paper, characters may be thus written upon it as it were in blue or brown ink."

The metallic desk on which the paper is placed is circular, and about twenty inches diameter.

"It is fixed on a central axis, with which it is capable of revolving in its own plane. A uniform movement of rotation is imparted to it by means of a small roller, gently pressed against

its under surface, and having sufficient adhesion with it to cause the movement of the disk by the revolution of the roller. This roller is itself kept in uniform revolution by means of a train of wheel-work."

The point of the wire, which may be considered as a pen, is gently pressed on this paper. When the current passes, it leaves a blue trace; when the current is interrupted, it leaves no trace.

It is clear, therefore, that by alternately transferring and interrupting the current, such a pen will leave on the paper a succession of lines and dots in any desired combination, precisely similar to those already described in the case of the American system of magnetic telegraph.

But the prominent feature of this system, which confers on it an immeasurable superiority over all which preceded it, is the extraordinary celerity of which it is susceptible. We have already stated that, in the experiments made with this apparatus before the Committees of the Institute and the Legislative Assembly at Paris, dispatches were sent along a thousand miles of wire at the rate of nearly 20,000 words an hour.

We shall now explain the means by which this extraordinary feat is accomplished.

"A narrow ribbon of paper is wound on a roller, and placed on an axis, on which it is capable of turning, so as to be regularly unrolled. This ribbon of paper is passed between rollers under a small punch, which, striking upon it, makes a small hole at its centre. This punch is worked by a simple mechanism so rapidly, that when it is allowed to operate without interruption on the paper passing before it, the holes it produces are so close together as to leave no unperforated space between them, and thus is produced a continuous perforated line. Means, however, are provided by which the agent who superintends the process can, by a touch of the finger, suspend the action of the punch on the paper, so as to allow a longer interval to elapse between its successive strokes upon the paper. In this manner a succession of holes are perforated in the ribbon of paper, separated by unperforated spaces. The manipulator, by allowing the action of the punch to continue uninterrupted for two or more successive strokes, can make a linear perforation of greater or less length on the ribbon; and, by suspending the action of the punch, these linear perforations may be separated by unperforated spaces.

"Thus it is evident, that being provided with a preparatory apparatus of this kind, an expert agent will be able to produce on the ribbon of paper, as it unrolls, a series of perforated dots and lines, and that these dots and lines may be made to correspond with those of the telegraphic alphabet already described.

"Let us imagine, then, the agent at the station of departure preparing to dispatch a message. Preparatory to doing so it will be necessary to inscribe it in the perforated telegraphic characters on the ribbon of paper just described.

"He places for this purpose before him the message in ordinary writing, and he transfers it to the ribbon in perforated characters by means of the punching apparatus. By practice he is enabled to execute this in less time than it would be requisite for an expert compositor to set it up in common printing type.

"The punching apparatus for inscribing in perforated characters the dispatches on ribbons of paper is so arranged, that several agents may simultaneously write in this manner different messages, so that the celerity with which the messages are inscribed on the perforated paper may be rendered commensurate with the rapidity of their transmission, by merely multiplying the inscribing agents.

"Let us now imagine the message thus completely inscribed on the perforated ribbon of paper. This ribbon is again rolled as at first upon a roller, and it is now placed on an axle attached to the machinery of the telegraph.

"The extremity of the perforated ribbon at which the message commences is now carried over a metallic roller which is in connection with the positive pole of the galvanic battery. It is pressed upon this roller by a small metallic spring terminating in points like the teeth of a comb, the breadth of which is less than that of the perforations in the paper. This metallic spring is connected with the conducting wire which passes from the station of departure to the stations of arrival. When the metallic spring falls into the perforations of the ribbon of paper as the latter passes over the roller, the galvanic circuit is completed by the metallic contact of the spring with the roller, but when those parts of the ribbon which are not perforated pass between the spring

and the roller, the galvanic circuit is broken and the current is interrupted.

"A motion of rotation, the speed of which can be regulated at discretion, is imparted to the metallic roller by clock-work, so that the ribbon of paper is made to pass rapidly between it and the metallic spring, and as it passes this metallic spring falls successively into the perforations on the paper. By this means the galvanic circuit is alternately completed and broken, and the current passes during intervals corresponding precisely to the perforations in the paper. In this manner the successive intervals of the transmission of the current are made to correspond precisely with the perforated characters expressive of the message, and the same succession of intervals of transmission and suspension will affect the writing apparatus at the stations of arrival in the manner already described.

"Now there is no limit to the speed with which this process can be executed, nor can there be an error, provided only that the characters have been correctly marked on the perforated paper; but this correctness is secured by the ribbon of perforated paper being examined after the perforation is completed, and deliberately compared with the written message. Absolute accuracy and unlimited celerity are thus attained at the station of departure. To the celerity with which the dispatch can be written at the station of arrival, there is no other limit than the time which is necessary for the electric current to produce the decomposition of the chemical solution with which the prepared paper is saturated."

Such are the means by which these extraordinary effects are produced; and we have been the more willing to give them with some detail because the memoir from which they are obtained is still unpublished, and the reader would in vain seek for this information elsewhere.

TO A LADY.

A LADY from a distant land,
Whose shores Atlantic billows lave,
Once more to tread her native strand,
Sailed o'er the western wave.

She reached at length that ancient isle
Of bardic fame in times gone by;
Renowned for many a holy pile,
With Gothic arch, and turret high.

Nigh where a church in ruins stood,
Dismantled in some hapless hour,
The lady paused in pensive mood,
And sighed to view its time-worn tower.

Then bringing from a neighboring wood
Fresh slips of ivy, gathered there,
She set them round the walls that stood,
And propped their trailing stems with care.

"When loudly roars the wintry storm,"
The lady said in tender tone,

"Thy leaves shall clothe its aged form,
Thy tendrils clasp each old gray stone.

"Above the ruins wild and hoar,
Thy mantle thou shalt gently spread,
And wave thy verdant banner o'er
The silent mansions of the dead."

How lovely at the shrine of age
Such tribute from the youthful hand!
How sweet thy pious pilgrimage,
Fair stranger, to thy fatherland!

And whether transatlantic beams
Shall o'er thy future footsteps shine,
Or by thy native woods and streams
Thy days glide on till life's decline,

Still memory, faithful to the past,
Will oft recall that touching scene;
And fancy wreath, while life doth last,
Thy name with ivy—evergreen!

From Tait's Magazine.

PHANTASIES OF WALPURGIS NIGHT.

FROM THE GERMAN OF ZSCHOKKE.

THE TEMPTER.

It was at Prague, a considerable distance from home, that I was once detained during April by business of importance. I might, perhaps, have found plenty of entertainment there if I had been disposed to enter into the amusements of the place. All my thoughts, however, were centered upon my distant home.

From my earliest years I have ever been fondly attached to my native town. It had become doubly dear to me from the time my wife had inhabited it. She was there at the time I speak of, and our separation had then lasted for a longer period than upon any other occasion since our marriage.

To be sure, we corresponded regularly; but my Fanny's letters, overflowing with tenderness and affection, served but to increase my impatience at our separation, till I wished Prague and St. Nepomuk were many miles to the N.E. of me.

The reader can conceive how heartily I thanked Heaven when my business was at last settled. I paid farewell visits to the few friends and acquaintance I had in Prague, and bade my host be ready with his bill, as I intended to start next day by the mail.

On the following morning, accordingly, he waited upon me very deferentially with an account of most portentous length. As I had not change about me enough to meet his charges, I felt for my pocket book, with the intention of cashing a note. To my horror the book was gone! I searched high and low, in every pocket, hole, and corner. It was all to no purpose. My anxiety may be conceived when I mention that the missing pocket-book, besides Fanny's letters, contained no less than two thousand dollars in notes, a sum which I could ill afford to lose.

It was no use to turn the room topsy-turvy—the pocket-book had disappeared.

Was it stolen or lost? I had it in my hands the day before. I generally carried

it in the breast-pocket of my coat. I couldn't help thinking that I had felt it safe as I undressed to go to bed the previous night. How to recover my precious papers was the question. If they had fallen into bad hands, they might be converted into silver or gold at a moment's notice. In the extremity of my distress, I could not help swearing—a most unusual thing with me. Oh, thought I, would that the devil prowled about as in the good old days of yore; I'd make a bargain with him on the spot. As I thought this, my mind involuntarily reverted to a figure I had met with in a billiard-room, some days before, in a closely-buttoned, tightly-fitting red surtout, and which I set down at the time as belonging to some potentate of hell, who had for some mysterious purposes assumed a human form for the time being. A cold shudder thrilled through me: and yet, in the extremity of my despair, I thought—and what if he were? he should be welcome, if he would but restore my pocket-book.

A knock at the door interrupted my semi-invocation. Aha, thought I, does the tempter mean to turn jest into earnest? I ran to the door, my head so full of the red surtout, that I verily expected to see its bearer walk in. And behold, wonderful to relate, as I opened the door, who should enter, with a slight inclination of the head, but the tempter in person, on whom my thoughts had been dwelling.

FURTHER PARTICULARS.

I must now explain how, and under what circumstances, I became acquainted with the apparition in question. At one of the tables in the coffee-house, where I happened to be one evening, were two persons deeply absorbed in a game of chess. Some young men, seated at the window, were engaged in animated discussion on the theory of spirits and the human soul. An elderly man of diminutive stature, clad in a scarlet surtout,

was pacing up and down the room, with his hands crossed behind his back. I called for some refreshment and took up a paper.

There was something about the mysterious man, as he strode to and fro, which irresistibly attracted my attention, to the exclusion of politics and all other current topics. Singular as was his choice of attire, his whole appearance was more striking and singular still. His features were repulsive, and yet most remarkable; although below the common height, his shoulders were broad and his frame well knit. He appeared to be from fifty to sixty years of age, and had the stooping gait characteristic of that time of life. His hair was coal black and bristly. There was something *uncanny* and repulsive in his sallow face, his high cheek bones, and hooked nose; and whilst every feature was cold, imperturbable, his large bright eye gleamed with a strange fire that it was difficult to attribute to any ordinary human thought or passion. He may be, thought I, an hereditary headsman, a grand inquisitor, a brigand chief, or king of the gypsies. From sheer caprice and wantonness, that man would fire a whole town, and impale infants on his lance. Right sorry should I be to meet him in a wood. Of a surety he never smiled in all his life.

There I was wrong. The man stopped to listen to the conversation alluded to, and laughed several times as it proceeded. But, gracious heavens, what a laugh it was! It fairly made me shudder. His features appeared animated with a fiendish glee. Well, thought I, if that being in the red coat be not the devil himself, he is next of kin to him. I involuntarily cast my eyes upon his feet, expecting to find them cloven; and though one certainly was made much as those of ordinary mortals, the other was clubbed, and confined in a lace-up boot. But he was not lame; on the contrary, he stepped as gingerly as though the floor were paved with egg-shells.

As he of the flame-colored garment passed the table where the players sat at chess, one of them triumphantly observed to his adversary, "You are lost beyond all hope."

Redcoat paused as he spoke, cast an eagle glance on the chess-board, and said to the self-complacent speaker, "Wrong; three moves more, and you are mate."

The victor smiled blandly; his hard-pressed adversary shook his head, and moved; the third move, and his exulting foe was defeated.

Whilst the players were disposing themselves to renew the strife, one of the young men at the window observed somewhat warm-

ly to Redcoat, "I infer, from your smile, that you entertain contrary opinions with regard to the nature of the world and the Godhead. Have you read Schelling?"

"Certainly," said Redcoat.

"And what means your smile? Your Schelling is one of your subtle poets, who look upon the phantasies of their brain as facts, because there is none to contradict them. It's the old story; the blind are discussing colors, and the deaf criticise sounds."

So said Redcoat. His words provoked discussion; but, without mingling further in the argument, he took up his hat, and glided from the room.

Since then I have not seen him, although I never forgot his remarkable figure, with his fiendish features, and was in constant dread of their haunting my dreams. And now, when least expected, I found myself closeted in the same room with him.

TEMPTATION.

"Pardon my intrusion; have I the honor to address Mr. ———?"

"The same," was my reply.

"What proofs have you of your identity?"

A singular question, thought I; the man is, no doubt, a spy of the police. An open letter lay before me. I took it up, and pointed to the address on the envelope.

"So far, so good; but yours is a very common name. I want more conclusive testimony. I may have to do business with you."

"Excuse me, sir, I am on the point of setting out on a journey; besides, you are mistaken in your man. I am neither merchant nor government official."

He looked at me for some time with evident surprise, and seemed as though about to take his departure; at length he observed, "Business, however, has detained you at Prague. Is not your brother on the verge of bankruptcy?"

The blood rushed to my face; for this, I had imagined, was a secret known to myself and my brother only. "You are again mistaken, sir. True, I have a brother, and more than one; but none of them are in the predicament to which you allude."

"Indeed?" muttered the tempter, incredulously.

"Sir," I returned, with some warmth, for I was distressed to think that any one in Prague should be aware of my brother's circumstances, "you have hit upon the wrong person. Excuse me if I beg you to explain your business at once. I have not a moment to lose."

"A minute's patience, I beseech you. I have an object in speaking with you. You appear ill at ease; has anything unpleasant occurred? I am not a native of Prague, and have not visited it for twelve years. Are you in want of money?"

As he spoke, the same smile, or rather grin, of fiendish malignity passed over his features. I mistrusted him more and more. My eyes fell by chance on his club foot, and I own to having worked myself up to a most uncomfortable pitch of superstition. I replied, however, that I was in no need of money; but that, as he appeared so friendly toward me, I should like to know his name.

"It will avail you but little to hear it; however, I am a Mandevil."

At this moment the door opened, and the landlord handed me a letter.

"Read your letter before we resume our conversation; no doubt it is from your dear Fanny."

I was more puzzled than ever.

"Well, have you any further doubts as to who I am, and the nature of my business with you?"

I felt half inclined to say—"Sir, I have not the slightest particle of doubt as to your personal identity with Satan himself, and anxious, accordingly, to make a bid for my unhappy soul;" but I resisted the impulse, and was silent.

"Moreover," he continued, "you are starting for Eger. My route takes me thither. Will you accept a seat in my carriage?"

I thanked him for his offer, but told him I had already ordered horses for myself.

This seemed to disconcert him, for he said—"How difficult it is to deal with you! I have set my heart upon making the acquaintance of your Fanny and children. Cannot you guess who I am? Do speak, in the Devil's name. Sir, I am really most anxious to oblige you."

"Well, then," quoth I, "if you be a sorcerer, my pocket-book is all safe; tell me how to recover it."

"Pooh! never mind your pocket-book; is there nothing else?"

"But I do mind my pocket-book; it was full of valuable and important papers. Tell me what I am to do if it be lost, or what steps to take supposing it to be stolen."

"What sort of pocket-book was it?"

I described it.

"Well, we'll see what is to be done. What return will you make me if I cause it to be restored to you?"

And he fixed his eye upon me as though

to extort the words—"My soul shall be yours;" but as I stood silent and bewildered, he put his hand in his pocket and produced the missing book.

"How on earth did you come by it?" I exclaimed, as I ascertained that the contents were untouched.

"I found it at four o'clock yesterday upon the bridge." [I now remembered to have taken it out at that very time and place.] "I examined the contents in order to ascertain to whom it belonged. I thus discovered your name and address, and I called on you last night to restore it."

I could almost have hugged my Mandevil in the plenitude of my joy. He would not listen to my thanks, but coolly said, as he closed the door behind him, "My compliments to the fair Fanny, and a happy journey to you. We shall meet again."

HOME.

During the whole of my journey I could not prevent my thoughts from reverting to the mysterious stranger. I recalled his demoniac laugh, his deformed foot, his swarthy hair clustering about his temples as though to conceal the horn that would have revealed his secret to the sons of men, and I firmly convinced myself of his identity with the Evil One. He had certainly behaved very handsomely in the matter of the pocket-book, but might not that have been, after all, but a snare to entrap my soul?

I bewildered myself in thinking of possible temptations. I thought of ambition, of wealth, of woman's beauty. But pooh! what had I to do with beauties? Was not my own sweet Fanny all in all to me? As the reader may conjecture, I was endowed with a tolerable degree of imagination, and I may as well admit at once that at an earlier period of my life, ere I knew my Fanny, I fancied myself most desperately enamored of a certain Julia. Her parents, however, would not consent to our union, and she subsequently became the bride of a wealthy Polish noble. Of course we cried, kissed, and vowed eternal fidelity, and, as generally happens in such cases, both got married forthwith.

Amidst all these fancies and reflections I entered my native town as the church clock was striking one. All was hushed in slumber. Unwilling to disturb my family at so late an hour, I resolved to pass the night at the inn, but I could not resist the temptation of strolling out to contemplate by moonlight that beloved home where, wrapped in sleep, lay all that was dear to me.

THE FATAL MEETING.

Not a soul was stirring. Fortunately, the summer-house was open. I entered; and saw by sundry little indications that Fanny and the children had but recently occupied it. I threw myself at length upon the sofa, and determined to pass the night there. I had scarcely closed my eyes, when I was aroused by a noise at the door of the summer-house. I sat up; and imagine my astonishment at beholding my friend of the red coat!

"Whence come you, in Heaven's name?" I asked.

"From Prague. I leave this within the hour. Hearing you had but just arrived, I thought, of course, that you would be still astir, and that I would pay you and your Fanny a passing visit. You must not sleep here, the damp will injure your health."

As I quitted the garden with him, I could not help saying, "You have scared me as though I had beheld an apparition; I tremble in every limb. What induced you to seek me in the summer-house? You seem to know everything."

Fiendish was his smile as he murmured, "Know you me now, and what I would of you?"

"No better than I did at Prague; but I must tell you the impression you then made upon me. I trust you will not take offence; but I fancied either that you held communion with spirits or were the Devil himself."

Again that sardonic smile. "Now, merely for the sake of the joke, assuming me to be the latter, are you disposed to do a little business with me?"

"You must bid high if you hope to win me, for really, Sir Devil—pardon my jest in so terming you—nothing can augment the happiness of my present lot."

"Ho! ho!" laughed he, "that was all well enough in the olden times, when folks still had some faith in the Devil's existence, and so kept wary watch over their silly souls; then one was fain to come to terms with them. Cheap enough are they now-a-days; the sons of clay, little reck they of the Devil, their sole reliance is on pure reason."

"I hold myself at a higher rate; and albeit, I regard Beelzebub as an old wife's story; still better worth is a grain of reason than the strongest conviction of the powers of hell."

"Spoken with all the pride of sorry mortals; suffer me to use the language of the personage I represent. Your arrogant self-reliance

brings more recruits to the gates of hell than would a swarm of fiends dispatched to tempt you. The best among your scurvy crew is he who has met but the fewest opportunities to sin."

"Spoken right fiendlike!" I exclaimed.

"Of a verity," answered he of the flame-colored doublet, smiling his horrid smile; "but it is the truth I speak, though all your faith in truth be gone. You are, in truth, already mine. Grant me but a single hair, and your head is no more your own; but the air is chilly—my carriage waits—I must hence."

I accompanied him to the inn, at the door of which stood his carriage; he begged me to enter the house, and partake of some punch he had ordered. I willingly complied, as the night air had rendered such beverage highly acceptable.

TEMPTATION.

The punch sent forth its grateful odor as we entered the room. We soon applied ourselves to it, and discussed a variety of topics over our glasses. At length my companion departed; and as I felt no inclination to return to the summer-house, ordered a bed at the inn. On my return to the coffee-room I perceived a lady. As she turned toward me I almost lost possession of my senses. It was Julia, my first love, who, as I afterward learned, was there with her husband, on their way to Italy.

"Gracious Heaven!" she cried, "is it you, Robert?"

I could but stammer "Julia!" in reply.

"We have much to say to each other, Robert. Follow me to my room."

Once there, and my heart, my soul, were all hers again. She was not happy, she said, her husband was harsh and stern with her. Did I remember our former vows, our last farewell, our parting kiss? Forgive me, my Fanny; how frail and weak is man. Julia's lips met mine once more. The door was flung suddenly open, and a tall, gaunt stranger entered abruptly, exclaiming, "Whom have you with you at this hour, Julia?"

We started up. Before us stood her husband, his face livid as a corpse, and unable to articulate a word. With three strides he was at Julia's side. He caught her by her long auburn hair, and dashed her to the ground, exclaiming, "False, worthless woman!"

I sprung to her assistance. He struck me

so violent a blow as I advanced, that I staggered back and fell. As I rose he still continued his frantic treatment of his wife, and yelled as he turned toward me, "You will I strangle with my own hands!"

In the agony of the moment I caught up a knife from the table, and threatened to plunge it into his body if he stirred; but he rushed upon me, and seized me by the neck with so vice-like a grasp that I felt I was losing consciousness. With the instinct of self-preservation, I thrust at him with the knife; he fell. He was stabbed to the heart.

Julia was moaning over the body of her slaughtered lord, whilst I stood motionless and thunderstruck. Oh, thought I, would it were all a dream, and that I were once more on my sofa in the summer-house. Accursed be the red coat; accursed the pocket-book! My children, my own dear injured Fanny, I am a murderer! Meanwhile the alarm had been given, and I heard the sound of approaching steps and voices. Flight was my sole resource. I snatched up a light, and rushed from the house.

THE CROWNING HORRORS.

I felt that I was pursued, and, hopeless of reaching the street, I dashed across the yard, and made for a barn, behind which were fields, on the outskirts of the town. My pursuers gained on me apace, and as I neared the barn I felt myself seized by the coat. Nerved by despair, I dashed aside the hand that clutched me, and thrust the light I bore into the stack of straw before me. High rose the flames; and in the confusion that followed I effected my escape into the fields. Onward, ever onward, I hurried desperately, over height and hollow, over break and bush. Was it a dream? Alas, my bloody hands bore witness too truly to the frightful reality. My strength forsook me; panting and exhausted I sank at the foot of a tree. What means that glare? why peal those bells? I looked around; the town was in flames—mine was the hand that had fired it.

Forsworn a murderer and an incendiary, and all within one short hour! Thou said'st well, fiend, the best among us is he who has met with fewest inducements to sin. Louder and louder pealed the bells, and I was about to resume my flight, when it suddenly occurred to me that this was the 1st of May, and my Fanny's birth-day. Well had I ushered it in, forsooth! Moreover, it was Walpurgis Night, when demons are said to hold their revels upon earth.

CAIN.

I paused for breath, and took hurried counsel with myself. I raised my hand to my brow, it was still bedaubed with blood. Away with these polluted garments, thought I, as I discarded coat and vest, and concealed them in the wood. None but the maniac or murderer travels in this guise. I must do battle with some peasant for his jerkin—lie hid by day, and journey by night; food, too, I require, and money. And I now recollected that my pocket-book was in the coat I had deposited in the wood. What was to be done? Not for worlds would I have looked again on the blood of the murdered man, or behold, through the opening trees, the red glare of the horizon. Suddenly, there approached, at a sober pace, a handsome traveling-carriage, drawn by two horses, and driven by a man, who, with a quantity of luggage, was its only occupant. As he was about to pass me, the traveler drew up, alighted from his carriage, inspected it most minutely on every side, and then quitted the road and walked a little distance into the wood.

Were mine yon carriage, it were well with me, thought I. Means of escape—money—clothes, all within my grasp; I may yet be saved.

'Twas done as quick as thought. One spring, and I was in the seat. I seized the reins, and was turning the horses' heads in the opposite direction, when their rightful owner issued from the wood and attempted to arrest their progress. I lashed them furiously, they reared and started at full speed forward, freeing themselves from their master's hold, who fell at their feet. The carriage passed over his body. He shouted for help. His voice pierced to my very marrow; it was the voice of one I well knew and loved. Could I believe my ears? I pulled up and stretched forth my neck to catch a glimpse of his face. It was my brother's!

I threw myself upon his body, life was not yet extinct. I raised him; I called on him; but he heard me not, he recognized me not; his head drooped, all was over. Again were my hands imbrued in blood.

REMORSE.

As I pressed my lips to my brother's lifeless brow, I heard voices in the wood. Ere I was aware of what I meditated, I found myself in the thickest of the wood,

having abandoned corpse and carriage to their fate. The sun was high in the heavens, the fatal Walpurgis Night was over. Morning beheld me bereft of home and hope. The curse of Cain was upon me. Visions of the headsman and his axe, the gibbet and the wheel, flitted before me. Was an existence such as mine worth the struggle to save? Should my own hand?—but no, I would deliver myself into the hands of justice.

Now, that I had settled upon the course to adopt, I became somewhat more calm. I rose and prosecuted my route. I had lost all traces of the track I was to follow; no matter—sooner or later, my object would be attained.

THE TEMPTER.

I held my course, until a turning in the road disclosed to me an overturned carriage lying along it, and at its side, who, to my horror or my delight, but—the well-known redcoat.

On perceiving me he grinned after his wont, saying, "Welcome; I thought we should meet again. Here have I remained the whole night. I dispatched my postilion to the town in search of assistance, and he has not yet returned."

"They need assistance more than you here," was my reply, "the whole town is in flames."

"I guessed as much, from the appearance of the sky. But what brings you here in the wood, why are you not lending a helping hand yonder?"

"Save me. I am steeped to the neck in crime. Since we last met, three short hours have sufficed to render me a perjured husband, a cut-throat and an incendiary, a highway robber, aye, and a fratricide; and yet, believe me if you will, I am at heart an upright man."

The redcoat stamped furiously with his misshapen limb as I spoke. "Know you me now," he cried, in a terrible voice, "and what I would with you?" he at length exclaimed.

"My soul, you would my soul; for now do I begin to believe you are in very earnest he whom I deemed you in Prague during my happier hours."

"Whom deemed you me, then?"

"The Evil One."

"Bow down, then, and worship me," burst he forth in tones that curdled my very blood.

I knelt before him in an agony of despair,

with clasped hands I besought him to save me, and my innocent wife and babes.

As I thus besought him, his outstretched foot (*that foot!*) spurned me, as I lay groveling in the dust before him. I rose and renewed my entreaties. His voice withered my soul, as he exclaimed: "Behold the mortal, in all the power and pride of his reason! Lest his measure of iniquity should not be full, lo, he crowned it by falling at the feet of Satan!"

"I know thee now, Satan, and thy wiles," I cried, "and I defy thee; for I feel that my soul can yet be saved: penitence and prayer may yet avail."

Harsh and contemptuous was his stern reply: "No, sir, I am no evil spirit: but a man like yourself. From a criminal you have become a madman—no uncommon phase in the chapter of crime. I despise you, nor, were it in my power, would I stretch forth my hand to help you. What care I for your soul? it is already ripe for hell. Satan would hold it dear at the meanest coin!"

HOPE.

Speechless and shame-stricken stood I before him; at length I mustered sufficient courage to address him once more.

"Would you were he for whom I took you. If you save me not, I am lost. Save me! But for you, and all this had never been. Who broke in upon my slumbers? Who made me wander forth in the night?"

"Aye, aye, 'tis always so; man ever seeks to shift his burden upon another, even though that burden be his brother's blood. True, I awoke you; but say, was it I who awoke within you your slumbering lust for guilt? As well may the midnight assassin impute his crimes to him who forged his sword."

"But why enact the fiend? why tell me that, once to yield a hair, was to peril one's head?"

"Was I mistaken? Who better knows it than myself? I craved no hair, of your own free will you tendered it. Had you resisted the first impulse, had you called reflection and religion to your aid, all had been well. Forget not that the first light and idle thought to which we give way is the one single hair within the clutches of the fiend. You exulted in your imagined virtue, you gloried in your hitherto unblemished career, but the germs of vice were quickening within you; they awaited but the first opportunity to become matured."

"I see and own it all; but save me, save me, the moments are precious; save me, and I sin no more."

"I hope to save you, but you must aid me to do so. *Know you me now, and what I would of you?*"

"You are my preserver, my guardian angel!"

"Not in vain was my appearance in your garden, or the warning I gave you; but be of good cheer, he who has faith has all."

I AM SAVED.

As he uttered the last words, I sank fainting upon the ground. It was long ere I returned to consciousness; as I re-opened my eyes, bewildered by the glare of the noon-day sun, I saw the old man bending over me; the harsh expression of his countenance was gone. Benevolence seemed painted on every feature. I looked wildly and vaguely on him. There was a confused din in my ears, as of the distant peel of bells, the rustling of the wind among the trees, or the far-off roar of some mountain torrent. I had lost all power of volition, and again I relapsed into a state of insensibility. At length I rallied sufficiently to inquire where I was, and what had happened. The old man was still bending over me: there was pity, hope, encouragement, in those eyes I had erst judged so ill.

"Thou art saved," he whispered in soft and soothing tones. "Fear not; weak wert thou, and infirm of purpose. Demean thyself, henceforth, as a man—but, remember, human being never save I twice."

Again I sank down in a kind of stupor, and was aroused by feeling the pressure of some invisible lips upon mine.

THE NEW WORLD.

That kiss restored me to earth, and now I discovered that my eyes still remained closed. I started from the hard cold couch whereon I lay, and beheld my own Fanny bending over me. Her kiss it was that had dispelled that fearful trance; my children clung about me, whilst Fanny rebuked me gently for having passed the night in that chilly summer-house. Had it not been for the arrival of my servant, she assured me that no one would have suspected my return.

"And has Christopher but just returned from the inn?" I inquired; "did he pass the night there?"

"Why, you strange man, of course he did,

and said that such were your orders. But why on earth pass the night on this dreary sofa? why not wake us up?"

How relieved I felt! "And so you passed an undisturbed, quiet night?"

"Only too quiet, since I little dreamt that you were so near me. Don't you know that it was Walpurgis Night, when evil spirits and goblins are abroad?"

"Too well I know it!" I exclaimed, rubbing my eyes, and overjoyed to find, as I clasped my Fanny to my heart, that our roof was still standing, and our little town as peaceful as ever. I told my dream to Fanny. She laughed heartily.

TEMPTATION AND THE TEMPTER.

It seemed as though my Walpurgis eve adventures were not yet terminated. As I have before said, it was my wife's birth-day, and some friends had been invited in honor of the occasion.

As we were placing ourselves at table, the servant informed me that a strange gentleman, a Baron Mandevil, desired to speak with me. Fanny observed me start as the name was announced. "Never mind the tempter," said she, "as long as the temptation is absent; and never mind the temptation as long as I am present."

I repaired to the summer-house, where I had passed the preceding night, and there, upon the very identical sofa that I had occupied, sat the redcoat of Prague himself. He rose and greeted me as though we were old friends, saying, "I am as good as my word, you see. Do not be jealous; I am determined to make your charming Fanny's acquaintance; moreover, I bring two guests with me, my brother and his wife. I believe you have met my sister-in-law before."

I was expressing my satisfaction at his visit, when in came a stout, burly gentleman, upon whose arm was leaning a lady in a traveling-dress. Imagine my surprise—it was Julia! I of course conducted my guests into the drawing-room.

The Baron made my wife the most flattering speeches as I introduced him to her.

"I lost my heart to you at Prague," he said, "upon reading all those pretty little secrets in your letter."

"I know all about it," retorted Fanny. "However, we have fourteen hundred dollars to set against your knowledge of our secrets; but you are a very bad man nevertheless, for you have made my husband pass a most wretched night."

"It is not over yet," said I, advancing toward Fanny, and introducing Julia to her. I could perceive that Fanny was somewhat taken aback; however, the wit that never deserts womankind soon came to her assistance, and she gave Julia a most hearty welcome. Ten minutes afterward, and you might have sworn that they had been friends from infancy.

I learned from Julia, as we walked in the garden after dinner, that she was very happy, and much attached to her worthy husband. She felt all a daughter's affection for her brother-in-law, who, as she told me, after having been a great traveler, had now settled down at Posen, where he possessed a small estate, and passed his time between agriculture and literary pursuits. She spoke of him with the greatest enthusiasm, and maintained that he had not his equal upon earth. I mentally resolved to reform my physiognomical theory.

"But why did you address that mysterious

phrase to me at Prague, "Do you know me now, and what I would with you?" I inquired of the worthy Redcoat; "it took the deepest hold on me, and influenced my dreams in the most unaccountable manner."

"Why, of course, I wanted to give you a hint that I had found your pocket-book. I did not say so at once, as I waited to learn from you such particulars as would have convinced me that you were its lawful owner. But you looked at me so suspiciously, and demeaned yourself so strangely, that I began to have my doubts."

I now related my story to him. "Walpurgis Night for ever!" cried he. "Your story is as good as a moral, philosophical and psychological essay. I am glad, however, that I turned out to be an angel of light after all, or the story would have told sadly against me."

I never slept from home again on Walpurgis Night.

"HYMN TO LIFE."

BY WILLIAM CHARLES KENT.

"Life, mystic Life! Thou art but as a ray
Of God's great splendor shot through carnal things;
A beam that, kindling sentience in dull clay,
Creates an angel, wanting only wings;
Thy flight an instant, and thy light a gleam,
That gilds each ripple on Time's troubled stream.

"Life, beauteous Life! Thou art but as a flower
Whose latent germ to sudden verdure blooms;
Of earth the ornament, of heav'n the dower,
Death crops thee in thy noon of rich perfumes;
And, ravish'd from their roots, thy blossoms rise,
To shed their fragrance in the radiant skies.

"Life, glittering Life! Thou art but as a gem
Borne from the billows of the awful deep,
To deck in turns th' imperial diadem
And russet cap of those who sow or reap;
Though shattered all thy form to worthless grains,
The gorgeous halo of thy hue remains.

"Life, changeful Life! Thou art but as a dream,
Full of false pleasures and illusive woe,
A vision such as 'wilder'd sophists deem
A problem whose solution none can know;
And when destruction's pang thy torpor breaks,
The soul not slumbers, but from sleep awakes.

"Then weep no more, ye mourners for the dead!
Nor sadden their grass-graves with sorrow's cloud;
No lengthen'd sufferings rack that nerveless head;
No cold heart throbs beneath that sullen shroud;
Corruption soars not where their spirits go;
Their crumbling relics only fade below."

From the Prospective Review.

THE DISCOVERIES OF THE MICROSCOPE.

A Practical Treatise on the Use of the Microscope, including the different Methods of preparing and examining Animal, Vegetable, and Mineral Structures. By JOHN QUEKETT, Assistant Conservator of the Museum, and Demonstrator of Minute Anatomy at the Royal College of Surgeons of England. London: 1848. 8vo. pp. 454.

FEW are cognisant, we suspect, of the recent improvements on the Microscope; though they have been such as to have raised it within the last quarter of a century, from being little more than a scientific toy, to the dignity of a most perfect instrument of research. And yet fewer, probably, are aware of the varied conquests which it has achieved during that short period:—though its recent discoveries will bear comparison, in point of rapidity, novelty, and importance, with those of any other epoch of similar length in the history of Natural Science. As an optical instrument, the microscope is now at least as perfect as the telescope, and its revelations altogether as surprising. The universe which it brings within our ken, in one direction, is as unbounded in its limits, as that whose remotest depths the most gigantic telescope still vainly attempts to fathom in another; and greater wonders of organization are disclosed in a speck of inconceivable minuteness, than the most mysterious nebula of the astronomer can exhibit to us. But more than this:—the generalizations in the phenomena and science of Life, to which its researches lead us, will be found as simple and comprehensive, as any which physics or chemistry have yet afforded. We propose to give our readers the opportunity of judging of the grounds of our assertions.

We need not dwell at any length upon the history of the microscope. It is sufficient to mention that, whilst the *simple* microscope, or magnifying glass, was known at a very remote period, the *compound* microscope,—the powers of which, like those of the telescope, depend upon the combination of two or more lenses,—was not invented until about the end of the sixteenth century; the earlier microscopes having been little else than modi-

fied telescopes, and both instruments having been first constructed, it would appear, by the same optician. From that period, almost to the present time, the microscope remained nearly stationary; no essential improvement was made in the optical principles of its construction, and but little in the mechanical appliances by which those principles were turned to account in practice. Every one possessed of a smattering of optical knowledge is aware that, in the passing of light through lenses of ordinary construction, there are two serious causes of error or aberration. Of these, one depends upon the spherical curvature of the lens; in consequence of which, the rays that have passed through its outer portion, meet in a focus much sooner than those which have passed through its central part, thus communicating a certain indistinctness to the image. The other is occasioned by the dispersive power of glass; the consequence of which is, an unequal refraction of the different rays of the solar spectrum, and the production of a series of colored fringes around every line or spot in the picture, totally destructive of a clear view of any portion of it. The first of these aberrations is termed *spherical*, the other *chromatic*. The only method at first thought practicable for preventing them from rendering both telescope and microscope virtually useless, was to contract the aperture of the lenses, so as to allow only their central portions to be in use. But this bungling expedient was necessarily attended with a great loss of light, especially when lenses of high power were employed: and in fact, it did nothing to *correct* the errors; it merely restrained their action within certain limits. Under these circumstances little could be expected from either the telescope or the mi-

croscope, as an instrument of scientific research, without a complete change in the principles of their construction. Despairing of such a change in the refracting telescope, Newton devoted himself to the improvement of the reflecting instrument. But in the middle of the eighteenth century, the want of uniformity between the refractive and dispersive powers of different transparent media was fortunately discovered; so that Dollond was enabled to construct compound lenses, in which the errors of the several component parts balanced or corrected each other, and an image was produced free from both chromatic and spherical aberration. From that period to the present, refracting telescopes have been constructed upon the achromatic principle; and the only limit to their power lies in the impossibility of procuring glass of a quality sufficiently pure and homogeneous for lenses of more than fifteen or sixteen inches in diameter. But this limit, as long as it remains such, must oblige astronomers still to rely on the reflecting telescope, as their greatest and last resource.

Looking back from our present point of view upon the history of the past, it cannot but excite surprise that no systematic attempt should have been made by Dollond or his successors, to introduce the achromatic principle into the construction of the microscope, considering that its alliance with the telescope is so intimate. The idea, however, would seem to have been regarded as hopeless, in consequence, not of any failure in the principle, but of the practical difficulties that stood in the way of its application. For whilst the progressive augmentation of the capability of the telescope depends on *the enlargement* of the diameter of the object-glass, the increase of its focal length, and the consequent diminution of its curvature;—that of the microscope can only be effected by *the diminution* of the focal length of the object-glass, the increase of its curvature, and the consequent reduction of its dimensions. It was supposed to be impracticable to make the necessary corrections and adjustments, in a combination of lenses, of a diameter sufficiently small to give even the lowest serviceable magnifying power to a microscope; far more, to make such corrections in those minute lenses of higher magnifying power, for the advantageous use of which they were more especially needed. It appears, indeed, that various attempts were made for this purpose toward the end of the last century, and in the early part

of the present. But their ill success prevented them from being carried further. Accordingly, we find Professor Amici, about thirty-five years ago, laying aside his experiments respecting the refracting principle, and endeavoring to improve the reflecting microscope, as had been first suggested by Newton. In the year 1823, however, a basis was laid for the improvement of the refracting microscope, by the construction of effective achromatic object-glasses. A combination of lenses on the plan of the object-glasses of telescopes, was brought to perfection by the late eminent optician Mr. Tulley, working on the instigation of Dr. Goring; whilst a different combination on another plan, since found more suitable to the microscope, was accomplished in Paris by M. Selligues, at the suggestion of M. Chevalier. Similar attempts were made soon afterward in various other quarters. Professor Amici resumed his labors on the refracting instrument; and the opticians of London, Paris, Munich, and Modena, vied with each other in producing lenses of higher power. Their exertions were crowned with such success, that Dr. Goring declared, in 1829, “that microscopes were now placed completely on a level with telescopes, and, like them, must remain stationary in their construction.” In that very year, however, Mr. J. J. Lister communicated to the Royal Society his discovery of certain properties in achromatic combinations, which had been previously unobserved. The improvements grounded upon this discovery are so important, that they constitute a new æra in the history of the microscope; and manipulative skill has since realized nearly everything which theory indicates as possible. Taking warning from Dr. Goring, we nowise affirm, that microscopes have now reached their limit of perfection; but we may safely say, that they have so nearly approached it, that a new *principle* of construction must be discovered before any essential improvement can be made in them. The highest magnifying power has been attained, that the microscopist can conveniently employ: the limit being determined by the shortness of the focus, that is, by the closeness of the proximity into which the object-glass must be brought with the object. No lenses of a shorter focus than a twelfth or a sixteenth of an inch can be made available in practice; and achromatic combinations are now constructed with such perfection, as to give a well-defined image of objects magnified from one thousand to two thousand diameters, or from *one to four million* times,

reckoning by superficial measure. And the completeness of the corrections made by them is truly marvelous, when we consider that every such combination consists of six distinct lenses, all whose curvatures must be accurately adjusted to the correction of each other's errors, the largest of the lenses scarcely exceeding an ordinary pin's head in diameter, whilst the smallest may be of the dimensions of the head of the smallest "minikin" produced by the pin-maker.

The attention of scientific men was early attracted to the compound microscope. In its original and rude form, it opened to them a field of research altogether new, and promised to add largely to their information concerning the structure of every kind of organised body. The Transactions of the Royal Society contain the most striking evidence of the interest taken in microscopic investigations two centuries ago. The early volumes, as Mr. Quekett remarks, "literally teem" with improvements in the construction of these instruments, and with discoveries made by means of them. The *Micrographia* of Robert Hooke, published in 1667, may be fairly styled one of the wonders of his day; and in 1673, the name of Leeuwenhoek appears for the first time in the Philosophical Transactions. That with the imperfect instruments at his command, he should have seen *so much* and *so well*, as to make it dangerous even now to announce a discovery, without having consulted the works of Leeuwenhoek, in order to see whether some anticipation of it may not be found there, must ever remain a marvel to the microscopist. This is partly to be explained by the fact that he trusted less to the compound microscope than to single lenses of very high power,—the use of which is attended with much difficulty, but which are comparatively free from the errors inseparable from the other instrument in its uncorrected form. The names of Grew and Malpighi, also, appear as frequent contributors to the early Philosophical Transactions; the researches of the former being chiefly directed to the minute structure of plants, those of the latter to that of animals. Both were attended with great success. Malpighi seems to have been the first to observe the wonderful spectacle of the movement of blood in the capillary vessels of the frog's foot;—an ocular verification of the doctrine of the circulation expounded by the sagacious Harvey. Glimpses of the invisible world of animalcular existence were occasionally revealed to the earlier microscopists. Their curiosity must have been strongly ex-

cited; yet they do not appear to have entered on this class of minute investigations with any portion of the persevering zeal which they devoted to the analysis of higher forms of animal and vegetable structure. Its wonders, however, were gradually unfolded; so that in the various treatises on the microscope, published during the eighteenth century, they occupy a conspicuous place. In the meantime, the microscope had serious difficulties to contend with, some from the nature of the case, some accidental. The defects inseparable from its original construction formed a bar to all discovery beyond certain limits. But it fell under a temporary cloud from another cause. When physiologists began *to theorize* on the elementary structure of the animal body, and to twist their imperfect observations into accordance with their theories, there soon followed a general suspicion of a want of trustworthiness in the microscope, and in everything announced upon its authority. The instrument and its advocates were brought into more or less discredit, the effect of which has continued to attach to them, in the minds of many, until the present day. We wish, therefore, to pause for a moment, and examine into the ground of this impression.

A tendency, common to all observers, is to describe what they believe and infer, rather than what they actually see. Microscopic observers were especially open to this reproach, as long as a want of definiteness in the image presented to their eyes, left so much to be contemplated by the imagination. But from the moment that the visual image presented by a well-constructed microscope, gave as good an idea of the object as we could have obtained from the object itself, if enlarged to the same size, and viewed by the unassisted eye, microscopic observations were made with the same degree of certainty in this respect, as observations of any other class. Another fallacy, common indeed to all observers, but of which the microscopic observations of former times had perhaps more than their share, arose from not sufficiently attending to a difference in the circumstances under which the observations had been made. Thus one observer described the human blood-corpuscles as flattened discs, like pieces of money, another as slightly concave on each surface, another as slightly convex, and another as highly convex, or even globular. Yet all microscopists now agree that their real form, when examined in freshly-drawn blood, is that of discs with slightly concave surfaces. The diversity in

the previous accounts was simply due to the admixture of water or other liquids added for the sake of dilution, which, being absorbed by the blood-discs, at first rendered their surface flat, then convex, and at last changed their form into the globular. But microscopical inquiries are no longer more exposed to fallacies of this description than any other branch of physiology. And the microscopists of the present day can be only held responsible for the errors of their predecessors, by persons who are ignorant of the perfection which the instrument has now attained, as well as of the general agreement regarding *facts* among all who are competent to use it, however they may differ in their *inferences*.

But our immediate object is to introduce our readers to some of the most interesting discoveries for which we are indebted to the recent improvements in the microscope; and we propose to pass lightly over such as the public may be presumed to be acquainted with, from their having been incorporated into treatises adapted for general circulation. We shall say little, therefore, of Professor Ehrenberg's laborious investigations into animalcular life, as well fossil as recent; although his additions of new forms of organized beings to the catalogue of the naturalist greatly exceed all that have been contributed by the most industrious collector in any other department. It may give some idea of their wonderful variety, to be told that Professor Ehrenberg detected in some specimens of tertiary deposit, brought a short time since from the island of Barbadoes by Sir R. Schomburgh, no fewer than 1,200 *new* specific forms. It was necessary to create 250 new genera for their reception: the mere naming of which must have constituted in itself no insignificant labor. Professor Ehrenberg first discovered, that various extensive deposits, both calcareous and silicious, are almost entirely made up of the remains of minute organisms; incalculable numbers of which must have successively lived and died, flourished and decayed, leaving the solid portion of their fabrics to accumulate during countless generations, and thus to form vast beds of chalk or strata of silicious sand. One of the most interesting discoveries of this class was recently communicated to the scientific world by Mr. W. C. Williamson. By means of a microscopic analysis of the white-mud, with which the sea-bottom of a great part of the Levant is covered, he has shown that the deposit consists almost entirely of organic forms; and among them

may be distinguished the shells of about twenty-five distinct species of animalcules, some silicious, others calcareous; besides certain other bodies hereafter to be noticed, which are determined by the microscope to be fragmentary particles of shell.

We owe to Professor Ehrenberg the separation of the remarkable group of the *Rotifera* or Wheel Animalcules, from a lower division,—to which he has given the name of *Polygastrica*. On the complex structure and high organization of the Rotifera, all microscopists are agreed; not so, with respect to the Polygastrica. Many distinguished naturalists question the high authority of Professor Ehrenberg in this instance: and maintain that the facts which he has observed do not bear out his inferences, and that his account of the digestive apparatus of the Polygastrica is not entitled to rank as a physiological truth. Into this question we shall not now enter. But it is right to state our conviction, that Professor Ehrenberg has included among his Animalcules many forms which are truly vegetable, and whose supposed polygastric structure is altogether a product of his imagination. The beautiful tribe of *Desmideæ*, which forms the subject of Mr. Ralfs's admirable monograph, is now almost universally admitted, in this country at least, to be of a vegetable nature; and the recent discovery of Mr. G. H. K. Thwaites of the *conjugation* of the *Diatomeæ* makes it next to certain that this group, to which a very large proportion of the silicious fossil animalcules (so called) belongs, must be transferred in the same manner to the domain of the botanist. The phenomenon in question is one of a very singular character: and as it is one of which the right understanding will probably lead to the remodeling of the whole fabric of Cryptogamic Botany, we shall endeavor shortly to explain it.

The attention recently paid to the simplest forms of vegetable existence has shown, what was previously suspected, that in the simple *cell* of the lowest *Algae* we may find the type of all vegetative existence. This cell grows from a germ, draws together the nutrient materials supplied by the surrounding air and moisture, combines them into new products, appropriates these products to itself by incorporating them with its own structure, multiplies its kind when it has itself attained maturity, and finally dies after performing all the functions of the most highly organized plants. And yet this cell is but a solitary *sacculus*, or minute bag, whose wall is composed of a transparent

colorless membrane, whilst its cavity contains a fluid, in which are held a number of granular particles of a red or green hue, mingled with others that consist of starch. Of aggregations of such cells, each of them a distinct individual, the "red snow," the "gory dew," the green matter of Priestly," and various other low forms of vegetation developing themselves in damp situations, are chiefly composed;—the cells being generally united by a gelatinous substance in which they are imbedded—but each one living for and by itself alone. Now, even in these insignificant tribes, we have the two modes of reproduction, as possessed by the higher plants, clearly sketched out. Whilst the cells continually multiply themselves by a system of *subdivision*, in which each splits as it were into two, an entirely new generation arises from the *approximation* of two cells, and the mingling of their contents. The immediate result is the formation of a *sporangium*, from which the new family is to spring, as the higher plant does from its *seed*. Now the process of multiplication, by the mere doubling of cells, is obviously analogous to the multiplication of the flowering plant by leaf-buds; the same that, in fact, takes place whenever there is a new growth in continuity with the old. But the act of conjugation, and the formation of the sporangium, represent the essence both of the flowering of the higher plants and of the ripening of the ovule. The fertilization of this consists (as we shall hereafter see) in the mixture of the contents of the two cells, which are set apart for the purpose, and which differ from the conjugating cells of the lowest Cryptogamia in no particulars of importance.

The process of conjugation has long been known to take place in a certain genus of Confervæ, which received the name of *Zygnema* in consequence. But the phenomenon was considered exceptional until within a very recent period. It has lately, however, been recognised among so many other tribes of the lower Algæ, that it must henceforth be looked upon rather as the rule. The fact that the origination of new generations proceeds from conjugation, or from the union of the cell-contents of two parent individuals, as well in the lowest Cryptogamia as in the highest flowering plant, has obviously a most important physiological bearing—for it leads us to revert to the opinions of those naturalists who have maintained the existence of sexes in the Cryptogamia generally. At the same time it affords a valuable means of dis-

crimination in regard to such ambiguous forms as the *Desmidea* and *Diatomea*, whose animal or vegetable nature may be probably determined by this test more satisfactorily than by any other; nothing that truly resembles the conjugation of plants having been yet seen in any tribe of an undoubtedly animal character.

The careful study of these simple forms of vegetation has also led to the discovery that *active movements*, strongly resembling those of many animalcules, are performed by bodies whose vegetable character is undeniably proved by the nature of the structures into which they are subsequently developed; in which fact we have the explanation of the strange doctrine of former microscopists, who taught that there are beings which are *animals* in the earlier state of their existence, and *plants* in the later. These movements depend on the same agency as those of many lower animals, namely, on the vibration of little hair-like filaments, termed *cilia*, from their resemblance to eye-lashes. The *cilia* first strike the water with a broad surface, like that of an oar; whilst, in returning to their original position, they present a feather-edge to the liquid, and thus propel with great energy the body to which they are attached. This ciliary movement however is not confined to animalcules. By means of it the oyster, though it does not itself move, yet creates a current in the surrounding water—bringing food to its mouth, and oxygen to its gills. In higher animals it covers many of the membranous surfaces, especially those of the respiratory organs. Even in man there are incalculable numbers of such cilia constantly at work in his air-passages, which prevent the accumulation of the mucous secretions in the smaller tubes, and assist in carrying them away. This addition to our knowledge of ciliary action has been chiefly the result of the systematic observations of Professors Purkinje, Valentin, and Sharpey, and was one of the earliest and most valuable fruits of the achromatization of the microscope.

That the red color of the blood of the higher animals does not exist in the fluid, but only in certain particles which float in its current, was known to Leeuwenhoek, and perhaps to still older microscopists; and the forms of these particles were observed to vary in different classes of animals. It was not known until recently, however, that these floating particles are true *cells*, analogous to those of the simplest Algæ—each having an independent life of its own, whilst all are

subservient to the life of the being through whose vessels they are carried—though in what precise way they are so has not yet been satisfactorily ascertained. It has been further proved by the reseaches of Mr. Gulliver, that there is not only a difference of *form*, but also of *size*, between the blood-discs of various animals; so that it is in many instances possible to distinguished with certainty between the blood of two animals belonging even to the same natural group. The contrast in size is very strongly marked in particular cases. While the diameter of the circular Human blood-disc averages something less than one three-thousandth part of an inch, that of the circular blood-disc of the Musk-deer is no more than one twelve-thousandth; and the large oval blood-disc of the Proteus measures nearly as much as one three-hundredth of an inch in length, and half that amount across its short diameter. It is a very remarkable fact that all the animals yet known, which agree with the Proteus in the retention of the gills after the lungs are developed,—remaining, in fact, all their lives in the condition of great tadpoles,—agree with it also in possessing blood-discs of unusual size. The fact that this character is presented by the blood-discs of the Lepidosiren, has been regarded as of no mean importance in discussing the real affinities of that curious reptile-like fish, or fish-like reptile.

We shall afterward revert to the microscopic analysis recently made of those various soft tissues of animals and plants, which are the immediate instruments of their vital operations, and on whose nature any general expression of the phenomena of life must be founded. But it is more convenient to consider previously the structure of the hard parts of animals, such as bones, teeth, shell, &c.; which present features of great interest, not merely to the physiologist who concerns himself about the vital phenomena of beings now alive, but also to the geologist who seeks in the fragmentary remains of past generations for materials to aid him in constructing a history of the earth. Of the organization of *bone*, nothing more can be made out by the naked eye, or through the help of ordinary magnifiers, than that the solid substance of its densest portions is traversed by a series of canals, which carry inward the blood-vessels distributed over the investing membrane (the periosteum); and that the spongy texture, found in the ends of the long bones and between the superficial layers of the thicker flat bones, de-

rives its character from the presence of a vast number of minute chambers, or *cancelli*, which are separated from each other by irregular and incomplete partitions, and into which also the nutritious vessels are prolonged. Nothing whatever was known of the structure of the bony matter itself; and no one could have even ventured to imagine the elaborate minuteness of its organization. But then a thin section even of the very densest bone is examined by a microscope of sufficient power, the solid substance is seen to be penetrated by innumerable tubuli of extreme minuteness, radiating from a series of isolated excavations, of tolerably regular shape and size, and so interlacing each other as to open a communication among all the neighboring cavities. To compare small things with great, let our readers conceive themselves in a cavern excavated in the centre of a vast mountain, with no principal entrance, but hundreds of narrow passages piercing its solid walls. Whichsoever of these they follow, it will conduct them, after many windings, into a cavern similar to that which they had left; and after passing through a long series of such passages and caverns, they will at last emerge into open day. Such, on a scale almost inconceivably minute, is the structure of solid bone. Let us reduce the spacious cavern to an excavation of 1.1500th of an inch in length, and 1.5000 of an inch in breadth; and let the passages be contracted from dimensions sufficient to admit of our entrance to a diameter of 1.20,000th of an inch (which is further diminished in the smallest branches to 1.60,000th of an inch), and we then shall have some idea of the wonderful contrivance with which this solid and apparently impervious substance is channeled out, like a coal-field by the miner. There cannot be a doubt but that this curious organization is in some way subservient to the nutrition of bone. The tubuli are far too minute to allow of the entrance of the blood as a whole; its floating particles, indeed, being nearly as large as the caverns themselves. But the great regularity of their arrangement, which is always adapted to keep up a communication between the interior of the bone and the nearest point to which blood is conveyed, seems to justify the inference that they take up from the circulating current, and distribute through the texture, such portions of the fluid as the bones require for their maintenance and consolidation. Very thin bones are nourished by blood, which is simply distributed over their surface; but larger and

thicker bones are traversed by passages, into which the vessels penetrate.

We are too conscious of the difficulty of conveying by words alone a distinct idea of so complex a structure, to venture to be sure that we have carried with us every one of our readers through the preceding description. We trust, however, that we have fully impressed them with the wonderful elaborateness displayed in the minute structure of bone. This elaborateness has no parallel in any of the hard tissues of which the skeletons of invertebrated animals are composed. And it seems designed, on the one hand, to minister to the continual changes which bone must undergo during the period of its growth, and, on the other, to confer upon bone that power of self-reparation which it so remarkably displays after disease or injury. It is interesting to observe that whilst, as in the case of the blood-corpuscles, there is no relation whatever between the size of the animal and the dimensions of the elementary parts of its bony skeleton,—the length of the cavernules and the diameter of the tubuli being nearly the same in the Elephant and in the Mouse, in the gigantic extinct *Iguanodon* and in the smallest existing Lizard,—there is yet a marked difference in these particulars between animals of different zoological groups. Thus the cavernules of Reptilian bones are distinguishable from those of Birds and Mammals by their great length in proportion to their breadth; and those of Fish may be usually recognised by their angular form, and by the small number of their radiating tubules. In certain species of the last-named class, however, there is an approach to reptiles, in general conformation; the minute structure of the bones also exhibits the same transitional character. The cavernules of the bones of Birds and of Mammals do not differ considerably in size: but there are diversities in the origin and course of the radiating tubules, which usually render it very easy to distinguish them. For our knowledge of these diversities we have principally to thank Mr. Quekett and Mr. Bowerbank. We will now adduce an example or two of their applicability as distinctive character, both in zoology and palæontology.

We have have already noticed the position of the *Lepidosiren* as one of the most interesting questions at present under discussion among naturalists; and have adverted to the large size of its blood corpuscles, as significant evidence toward determining its real place in the scale. We may now add, that

in the minute structure of its bones, its relationship to the perenni-branchiate reptiles, rather than to fish, is no less decided,—the form and size of the cavernules, and the distribution of the tubuli, corresponding closely with what is seen among the former, there being nothing parallel in the latter class.

In the determination of the real nature of fossil bones, whose imperfect preservation or whose insufficient characters render their recognition difficult and uncertain, the value of the microscope has been no less satisfactorily established. Dr. Falconer, the distinguished investigator of Himalayan palæontology, having met with certain small bones, about which he was doubtful, placed them in the hands of Mr. Quekett for minute examination, and was informed, on the authority of the microscopic test, that they might certainly be pronounced reptilian, and probably belonged to an animal of the turtle tribe. They subsequently proved to be the toe-bones of the *Colossochelys Atlas*, the gigantic fossil tortoise, nearly twenty feet in length, discovered by Dr. Falconer in the Sivalik region.

The test has been applied, with equal success, by Mr. Bowerbank to the determination of some doubtful wingbones found in the chalk near Maidstone. The question of their ownership lay between the long-winged seabirds, such as the Albatross, and the ancient Pterodactyles, or winged lizards. The evidence from external form inclined somewhat in favor of the former; and, as no Pterodactyle of a greater spread of wing than five or six feet had been previously known, it was thought an additional proof of the ornithic character of these bones, that they must have belonged to an animal whose wings measured at least eleven feet, when fully extended. But the minute structure of the bones of undoubted Pterodactyles is decidedly characteristic of their reptilian nature; and they have additional well-marked peculiarities, such as have not yet been found in any other animal. The fact, therefore, that a complete identity of structure has been ascertained to exist between the bones of the Maidstone fossil and those of the genuine Pterodactyle, appears to us to settle the question of the real nature of the former. The structure in question is unlike that of any bird, as it is accordant with that of this peculiar reptile. And the essential characters furnished by the minutiae of organization, are now universally admitted by competent judges to possess a higher value than those adaptive characters drawn from external

configuration, which have reference only to the purposes of the organ. It is true, we must extend our ideas of the dimensions of the flying reptiles, which took the place of birds in the atmosphere of the ancient world. But this will not be a real difficulty in the apprehension of any one at all conversant with the other gigantic forms of reptilian life now extinct. Some future palæontologist, whose first ideas of the marine birds of our epoch had been formed upon the fossil remains of a Gull, might, with equal reason, object to the idea that a bird, of the dimensions of an Albatross, ever soared over our ocean. We cannot doubt but that the general application of this test will prove most advantageous in the determination of the true nature of fossil bones, whose external characters are ambiguous; and we may hope thus to see the termination of those conflicting statements, which have in so many instances obscured the truth, and led to acrimonious discussion.

The researches of the microscope into the organic structure of *teeth* have been equally successful; not only for the purposes of the physiologist, but, most unexpectedly, for those also of the zoologist and palæontologist; scarcely any means for determining affinities and recognising imperfect fossil remains being so precise and certain as the minute diversities in teeth. The real structure of teeth was first noticed by Leeuwenhoek. In the Philosophical Transactions of 1678, he described the human tooth as "made up of very small, straight, and transparent pipes," and in a subsequent paper he calculated that the number of these "pipes" in a single molar amounted to nearly *five millions*.

He spoke, also, of their existence in the cod and in the haddock. But these observations were so completely overlooked by later writers, that the controverted question, whether teeth possessed an organic structure, was very generally decided in the negative until a recent period. Teeth were considered, in fact, as mere stony exudations from the surface of the tooth-pulps, and so far assimilated to shell. The achromatic microscope, however, had not been long in the hands of anatomists, before the investigation of the structure and development of teeth was taken up anew, under more favorable circumstances; and there is, probably, no single branch of microscopic inquiry which has been, or which is likely to prove, so fertile in valuable results. Into the troubled question of priority we have no desire now to enter; but content with ex-

pressing our obligations to Purkinje, Retzius, Müller, and Agassiz among continental anatomists, and to Owen Nasmyth, and Tomes, among our countrymen, we shall proceed with our endeavor to convey a general idea of their labors.

The greater part of the substance of the teeth in the higher vertebrata, and the whole of it in the lower, consists of the substance commonly termed *ivory*, but which has been more appropriately termed *dentine*; meaning by the word "*dentine*," what is essential to the composition of the dental structure, and restricting the word "*ivory*" to certain varieties of the substance. Dentine, like bone, is made up of an apparently homogeneous substance, composed of animal and mineral matter in intimate union. Like bone, too, it is channeled-out by innumerable passages of extreme minuteness, which, though incapable of admitting blood, seem to convey the nutriment absorbed from it. There is no system of cavernous excavations, however, in true dentine; the tubuli passing continuously onward, instead of merely traversing the spaces between successive chambers as in bone. In human teeth, and in others whose dental structure is equally simple, the tubules originate from the central pulp-cavity, and radiate outward with great regularity; their course being slightly sinuous, but having a constant direction toward the exterior of the tooth. The diameter of their calibre near their central commencement does not exceed 1/10,000th of an inch; and this gradually diminishes, as the tubuli pass outward, and send off lateral branches, until it is reduced at their terminations to the smallest channel that can be distinctly traced through the solid substance. In the teeth, however, of many animals, there is no single central pulp-cavity, but the whole substance is excavated by vascular canals, very analogous to those of bone. We find, in such cases, each canal the centre of a system of radiating tubuli, so that the transverse section of the tooth strongly resembles that of bone, except in the absence of the cavernules. This type of structure prevails chiefly among fishes: and it is a curious fact, that in this group, the lowest in which true bones and teeth are found, the characters of the two structures should approximate so much more closely than in the higher classes, where both are elaborated, each in its own fashion until they become distinct. In other instances, again, where a central pulp-cavity does exist, it sends vascular prolongations for a certain distance into the dentine: the outer

layers of this substance, however, are very seldom thus penetrated by blood-vessels.

The dentine is capped, in the human tooth, by a layer of a harder substance, familiarly known as *enamel*. This is the hardest of all the animal tissues; and is indeed so completely mineralized, that the organic basis does not form above two or three per cent. of its components; yet it presents a very distinct organic structure. It is composed of a series of prismatic membranous *cells* (resembling those of a honey-comb in miniature) arranged side by side with great regularity. Their lower extremities rest upon the surface of the dentine, whilst their upper ends form the crown of the tooth; and the extraordinary density of the tissue appears to be occasioned by a deposit of calcareous matter, with which the cells are completely filled, and in which phosphate of lime predominates. The strength of these enamel-prisms is increased by the wavy curves in which they are arranged. By this means their alliance is much more dependent and complete, than if each of them were a straight column supporting its own separate share of pressure. The disposition of the enamel varies greatly in different tribes of Mammalia, according to the purposes to which the teeth are to be applied. Thus in the long front teeth of the Rodents, we find it only upon the front surface, where, owing to its superior density, it constantly projects beyond the ivory, and maintains a sharp cutting edge, however much the tooth may be worn down. In the herbivorous Mammals, the surface of the grinding teeth is merely penetrated by vertical plates of enamel, instead of being covered with a continuous layer; and their superior density and resistance are the cause of those ridged inequalities of the grinding surface, which enable them to triturate their tough vegetable food. In Sloths, and other edentate Mammals, the enamel is altogether wanting.

A third substance, the "*cementum*," or "*crusta petrosa*," has long been known as a constituent of the teeth of herbivorous animals; but it is only lately, by means of the microscope, that its existence in human teeth has been detected. The intimate structure of the "*cementum*" is the same with that of bone. It has the same system of cavernules and tubuli communicating with the nearest vascular surface; and its thick layers, whenever they exist, are penetrated by vascular canals. As it invests the fang of the tooth, it forms a bond of vital union between the denser structures of the tooth it-

self, and the bone in which it is implanted. In herbivorous Mammals, on the contrary, it penetrates, like the enamel, the substance of the grinding teeth; the vertical folds in which it is arranged, being softer than the dentine, are most rapidly worn down; and the inequality produced by the superior density, and consequently slower abrasion, of the enamel, is considerably increased.

Such being the structure of teeth and their three component parts, it is evident from our verbal sketch, that they deserve a far higher character than that of mere inorganic exudations. Without entering into the history of their development, by the consolidation of the soft tissues forming the *pulp* of the tooth, the knowledge of the fact is of the utmost importance in interpreting the phenomena of disease, and has already led to great improvements in dental surgery.

The varieties of dental structure produced by differences in the arrangement and relative amount of these three components are in themselves very numerous; and they are vastly increased through the diversities exhibited by the minuter characters of each tissue. To some of these we have already alluded; and instead of formally detailing others, we will adduce a few examples, by way of proof, of the assistance which microscopic research has already rendered to the Naturalist.

There have been few questions in palæontology more fruitful of discussion, than that of the precise zoological affinities and habits of life of the great extinct Megatheroid quadrupeds of South America. They present the strange phenomenon of a skeleton more closely resembling that of the sloths, than any other; not merely expanded to a colossal size, but developed with a massiveness unparalleled in any other animals of similar dimensions. The feet, on the other hand, were constructed rather upon the plan of those of the ant-eaters and armadilloes; being obviously capable, in virtue of their long, curved, sharp-edged claws, of being used as efficient instruments for digging or excavating the soil. In consideration of these peculiarities of conformation, as long as attention was not paid to the characters furnished by the teeth, an opinion was entertained by many distinguished palæontologists, that these strange beasts must have burrowed in the ground like the pigmy armadilloes of the present time, and have fed upon the roots which they there met with. From the examination of the minute structure of their teeth, however, ample evidence was obtained

by Professor Owen, that the food of the Megatheroids must have been of the same description with that of the existing sloths; that is, it must have consisted of vegetable matter, capable of being easily reduced to a pulpy state, such as the leaves and young shoots of trees: for the teeth are entirely destitute of enamel; without which it is impossible that tough fibrous roots could be ground down. The greater part of their substance is made up of coarse vascular dentine; the exterior being composed of vascular cementum, and the harder non-vascular dentine forming only a hollow cylinder between the two. The conformation of the skeleton having been re-investigated by Professor Owen under the guidance of this most important indication, he succeeded in obtaining a most satisfactory solution to the problem of their mode of existence. They prove to be Sloths in all their essential characters—but adapted to live upon the ground, instead of climbing trees; which could not have sustained their enormous weight, even had it been possible to endow them with the climbing power. Not only were their limbs expanded to a colossal bulk, but, from its size and strength, their tail also was obviously designed for an organ of support; forming a firm tripod with the hind legs. Upon this tripod we may conceive the gigantic Mylodon or Megatherium to have reared itself, after having excavated with its trenchant claws the earth around the roots of the trees on whose leaves its hungry eyes were fixed; thus, raising itself upright, and placing its fore-feet against the trunk, it would sway the tree to and fro, until it had brought it down, and so provided itself in its foliage and tender shoots with a supply of food.

The "Odontography" of Professor Owen will afford us another example of the value of the microscope in determining the nature of a doubtful fossil. This work contains the results of the laborious and accurate observations of its distinguished author, upon almost every principal tribe of the three classes of vertebrata in which teeth are present; and must constitute the foundation of all future researches on this subject. In the case in question, a few scattered teeth were almost the only indications of animal life throughout an extensive stratum: and they happened not be characterized by any peculiarity of external form—so that their real nature would have remained doubtful, unless the microscope had enlightened us on their internal structure. Some years ago, certain detached teeth were found in the keuper-

sandstone of Wirtemberg, and were described by Professor Jaeger as the remains of a gigantic Saurian reptile, to which he gave the name of *Mastodonsaurus*. Other fossil fragments of jaws and teeth from the same formation were described under the name of *Phytosaurus*. A third remarkable and characteristic fossil discovered in the keuper-sandstone, consisted of a fragment of a cranium having certain peculiarities of the Batrachian reptiles; and on this fossil Professor Jaeger founded his species called "*Salamandroides giganteus*." In a sandstone deposit in Warwickshire again, certain teeth or fragments of teeth, at first supposed to be of saurian character, had also been discovered. Whether this sandstone was the equivalent of the keuper or of the bunter division of the new red sandstone formation, as developed in Germany, was an important question. Accordingly, it became also of importance to determine whether the Wirtemberg and the Warwickshire fossil teeth were of identical or of allied species, or whether they were altogether dissimilar. Now the external forms of teeth of reptiles are seldom so characteristic as in Mammals, whose teeth are much more adapted to their several kinds of food. It is not at all surprising, therefore, that Professor Owen was unable to pronounce upon this question, from the comparison of their external aspect alone. But, on procuring a thin section of one of the Wirtemberg teeth, and placing it under the microscope, a most wonderful and complicated structure presented itself to his astonished view. Of this structure we almost despair of conveying an idea by words alone. We will, however, try with the assistance of some of the forms which connect it with the ordinary types of dental structure. Our readers must first picture to themselves a hollow cylinder of dentine, covered externally by cementum, and enclosing the soft pulp of the tooth; and then imagine the cylindrical wall to be thrown into a regular series of wavy folds arranged vertically; they will thus understand the formation of the lower part of the tooth of the extinct *Icthyosaurus*—and also that of the tooth of the *Lepidosteus* or Bony Pike, one of the few sauroid fish still existing. But let them further suppose these folds to be deepened, so as to become a series of plaits, all directed toward the axis of the cylinder, and in contact with each other at their sides; and afterward, suppose the plaits themselves to be thrown into secondary folds and convolutions, so as to present very much the aspect of the surface of the brain; they will

then have some idea of the extraordinary structure of this tooth, the original possessor of which has since received the very expressive designation of *Labyrinthodon*, the former name of *Mastodonsaurus* being no longer appropriate. It was only after making sundry sections of this tooth in various directions, and frequently comparing them with numerous examples of the teeth of Saurians, Batrachians, and other animals, that Professor Owen at length comprehended the cerebri-form convolutions by which every portion of the tooth of this most singular reptile of the keuper-sandstone is so remarkably distinguished. Once fully comprehended, however, all this complexity was found to be apparent only; for each wavy fold has on one side of it an extension of the central pulp-cavity, from which its dentinal tubes proceed; whilst its other border properly forms part of the external surface of the tooth, carried in by this extraordinary duplication toward its centre, and thus everywhere in its usual relation with the cemental layer.

The next step was, of course, to make a similar examination of the teeth from the Warwickshire sandstone. The result left no doubt but that they belonged to the same genus with the German specimens; and this, in connection with other evidence, sufficiently proved the equivalence of the German and English deposits. A most interesting zoological problem now came under consideration;—what was the nature of the animal to which these teeth belonged? They had been referred, from *external* characters, to the Saurian order; but these characters were by no means conclusive, owing to the general similarity of form which prevails through that entire class. As the nearest approaches to the peculiar *internal* structure of the teeth are presented by Fish-lizards, and Lizard-like fish, it might be reasonably expected that the *Labyrinthodon* would combine with its reptilian characters an affinity with fish. This turned out to be the case on an examination of the fragments of the *skull* of the Warwickshire fossils, with which the teeth remained in connection; and the analogy was confirmed by comparing them with the Batrachian remains in the keuper-sandstone. All things considered, there can be no question, we think, but that the *Labyrinthodon* was in reality a gigantic Batrachian or frog-like animal, five or six feet in length, with some peculiar affinities to fishes, and a certain mixture also of Crocodilian characters.

Now, it happens that, in various locali-

ties, where beds of the new red sandstone formation have been exposed, and especially in the Stourton quarries, near Liverpool, *foot-prints* are found, which afford unmistakable evidence of the former existence of an air-breathing animal, whose posterior extremities must have been of most disproportionate size, and its foot of a singular hand-like shape. The provisional name of *Cheirotherium* had been bestowed upon this unknown quadruped, and more than one palæontologist suggested that the creature must have been a Batrachian reptile. But it was objected that the gigantic dimensions of the hypothetical frog were without a precedent; and that its feet were unlike those of any existing Batrachian, or, indeed, of any reptile whatever. We have now seen, however, that in beds of the very same formation, there have been found the teeth and bones of a gigantic Batrachian reptile, whose dimensions and proportions would agree with the foot-prints in question; and which differs from any other Batrachia,—indeed from all other reptiles,—in the structure of its teeth, and therefore (it may fairly be inferred) also in the structure of its extremities. It appears to us, therefore, that a very satisfactory case is made out by Professor Owen in favor of the identity of the *Labyrinthodon* and the *Cheirotherium*; and we cite it, for the purpose of observing that the most important link in the chain of evidence was furnished by microscopic examination of the teeth.

Though we have dwelt so long upon this example, before leaving it we wish to notice a curious fact connected with it. Very shortly after the publication of the second part of Professor Owen's *Odontography*, containing his beautiful delineations of the dental structure of this fossil, a pocket-handkerchief was made in Manchester, with an enlarged copy of the section of the *Labyrinthodon* tooth for its pattern! It would be well, we think, if our manufacturers had recourse more frequently to Nature for suggestions. The sections of the spines of the *Echinus*, whose remarkable structure we shall presently notice, would supply a vast variety of patterns of wonderful delicacy and beauty, both of form and color.

We will instance only another application of the microscope to this branch of inquiry, in a recent example of great interest to economy as well as science. A continuous rock-formation extends over many parts of Russia, bearing a strong resemblance in its mineral characters to members of the Permian and Triassic systems,—the magnesian limestone

and new red sandstone of our own country. But so great was the difficulty of obtaining from stratification any evidence of its proper place in the series, on account of the prevalent horizontality of the strata, that the only hope of settling the question rested upon the organic remains which might be discovered in the formation. Unfortunately these were few and fragmentary,—consisting chiefly of teeth which are seldom perfectly preserved. From the gigantic size of these teeth, together with their form, it was at first inferred that they belonged to Saurians. But the microscopic investigations of Professors Asmus (of Corpat), Agassiz, and Owen, have proved them to be the teeth of gigantic fishes, and to belong to a genus (*Dendrodus*) whose presence is restricted to the Palæozoic formations. The deposit in question is therefore a representative of the *old*, not of the *new*, red sandstone,—a determination of the greatest practical moment; for, on the former supposition, that the teeth were the remains of Saurians, coal-measures would have been expected to lie below; and extensive borings might have been carried on, involving great expenses. The discovery that the remains belonged to fishes of the Devonian epoch put an end to all such expectations.

The line of inquiry which was opened by these and similar discoveries has been successfully followed up by Dr. Carpenter. He has demonstrated the organic structure of the *shells* and other external skeletons of invertebrated animals; and has shown that the diversities are, in many instances, sufficiently definite in their characters to determine the family, sometimes the genus, and occasionally even the species—from the inspection of a minute fragment of the shell, fossil as well as recent. The most recent conchological writers had been of opinion, on the contrary, that shell was not merely destitute of blood-vessels, but was completely *inorganic*,—composed, in fact, of an exudation of calcareous particles, cemented together by animal glue. Even the celebrated geologist and Palæontologist Von Buch, when first informed of the result of these observations, exclaimed that it was “impossible” that shells should possess any organic structure. An *a priori* probability, however, in favor of their possessing a certain degree of organization followed the discovery of the organic structure of the epidermis or cuticle of higher animals; and the progressive elevation of physiology as a science, which now enables it to *predict* phe-

nomena, as well as to record and generalize them, is well illustrated by the fact that Dr. Carpenter had published in 1841, some time before the commencement of his direct investigations, the following anticipation of their results; “From the analogy which the shells of Mollusca and Crustacea bear to the epidermic appendages of higher animals, there would seem reason to believe that the former, like the latter, have their origin in cells, and that these are afterward hardened by the deposition of earthy matter in their interior.”*

Indeed, the shells of Mollusca may be regarded as strictly *epidermic* in their character; since they are formed upon the surface of the *mantle*, which answers to the true skin of other animals. They appear to be always composed, in the first instance, of epidermic cells, consolidated by the deposit of carbonate of lime in their anterior; and in many cases such is the structure, distinctly exhibited in the fully formed shell, and visible in the membranous residuum, after the removal of the calcareous matter by dilute acids. It often happens, however, that the original cellular organization is obscured through subsequent changes, by which new forms of tissue are produced; and we sometimes lose all traces of it. Certain shells have a very elaborate *tubular* structure; the tubes being disposed in an irregular network near the internal surface, with which they appear to communicate, and sending off long straight branches at intervals which pass toward the exterior. These tubes are usually much larger than those of teeth and bone—their diameter being frequently as much as 1.4000th of an inch. Still it does not appear probable that they receive blood; though they may be well supposed to imbibe nutritious fluid from the surface of the mantle for the reparation of the exterior of the shell; more especially as most of the species in which they abound are remarkable for their foliated or sculptured surface. The peculiar group of bivalves, known under the designation of *Brachiopoda*, is of the greatest interest to the palæontologist. Their proportion to the ordinary bivalves is at present quite insignificant; but it includes nearly all the bivalve shells which were most abundant in the earlier part of the Palæozoic series. A most unexpected structure has lately been discovered in them. Not only is the texture of the shell itself so

* Principles of General and Comparative Physiology, 2nd edit., p. 33.

peculiar, that almost any species may be recognized as a Brachiopod, from the microscopic examination of even a minute fragment; but in a considerable section of the group, the soft organs of the animal within are seen to be actually prolonged into the substance of the shell, passing through it to its external surface.

The real structure of *nacre*, or mother-of-pearl, to which its iridescence is owing, has also been determined by a similar method of inquiry. The peculiar lustre of this substance was long since discovered by Sir D. Brewster to be due to the striation of its surface by a series of very shallow grooved lines, which usually ran parallel to each other; and it was found that impressions taken from it on sealing-wax, gum, or any other similar material, would exhibit the iridescent colors. Many of our readers are doubtless familiar with the fact, that it has been found possible to communicate similar prismatic hues to metallic surfaces, by ruling them with lines by means of a diamond point, at the distance of $1/10,000$ th of an inch from one another. Indeed, if such lines be ruled upon a die of hardened steel, the iridescence is developed in every metallic surface which receives its impress. As the lines upon *nacre* are not obliterated by any amount of polishing, it is evident that their presence depends upon something peculiar in the intimate texture of this substance, and not upon any merely superficial arrangement. Sir D. Brewster supposed this peculiarity to consist in an alternation of layers of mineral membrane and calcareous matter,—the grooves being produced by the wearing away of the former. Now, supposing every line upon the nacreous surface to indicate a distinct layer of shell substance, a very thin section of mother-of-pearl ought to contain many thousand laminae, in accordance with the number of lines upon its surface. But what is the fact? When the calcareous portion of the *nacre* is dissolved with dilute acid, no such repetition of membranous layers is to be found. On the contrary, if the piece of *nacre* be the product of one act of shell-formation, it furnishes but a single layer of membrane. In the investigation of this curious problem, Dr. Carpenter availed himself of the peculiar facilities afforded by the well-known *Haliotis splendens*, the remarkable variety of hues in whose shell is produced by the alternation of layers of *nacre* with laminae of a horny substance like tortoise-shell. And he was thus led to the discovery that the iridescence may con-

tinue in the *membrane alone*, after all the calcareous matter has been removed by acid.—provided that this membrane retain the folds or plaits in which it was originally disposed, and to which the lineation of the *nacre* is evidently due. On the other hand, if the membrane be extended, so as to obliterate the folds, its prismatic lustre entirely disappears. The conclusion is, a complete confirmation of Sir D. Brewster's optical discovery of the dependance of the iridescence upon the lineation of the surface, and at the same time a correction of his explanation of the cause of it.

As in the case of bones and teeth, the peculiarities of intimate structure displayed by many shells have enabled the microscopist to identify even minute fragments, which had nothing characteristic in their external forms. For instance, there are certain tribes, both recent and fossil, whose other characters leave a doubt respecting their true place in the series—such as the curious extinct group of *Rudistes*—where the results of a similar examination appear to furnish the decisive evidence required.

The shells of *Crustacea* are shown by the microscope to be even more highly organized than those of *Mollusca*. A section taken across the black end of the claw of the common crab exhibits a structure exactly resembling that of dentine; the dense homogeneous substance being traversed by a multitude of tubuli radiating from the central cavity toward the circumference. The same structure is found in other parts of the shell, but the texture is less dense; the extremity of the claw obviously requiring, for its prehensile purposes, a special degree of firmness. The surface of the shell is covered by a layer of flattened cells, fitted to each other by angular borders, so as to form a continuous layer. These cells have the power of secreting coloring matter; and it is from the secretions which they elaborate, that the hue of the surface, with all its variations, is derived.

The minute structure of the skeleton in the class of *Echinodermata* presents features of peculiar interest. This class includes, not merely the *Echinus* (sea-urchin,) and *Starfish*,—its best known forms,—but also the *Holothuriae* (sea-cucumbers,) and the vast group of *Crinoidea*, which are scarcely at all represented at the present epoch. The forms and conditions of these animals have apparently nothing in them common to all. What is the similarity, for example, between the zoophytic *Encrinite*,—an animal some-

what resembling a star-fish, but attached to a stony stalk to one fixed point during its whole existence,—and the free-moving, soft-bodied *Holothuræ*, which, as their vernacular name implies, are sometimes so elongated as to present an entirely worm-like aspect, and in which we frequently lose all trace of the radial symmetry by which the group, as a whole, is characterized? Notwithstanding this apparent absense of a community of nature between the extremes, the groups in question are united by such a continuous series of intermediate forms, that no naturalist has felt any hesitation in placing them together in the same class. To this class, however, it has been hitherto impossible to assign any precise general character. The character conveyed by the designation *Echinodermata* (prickled-skinned,) is of very limited application. For the prickles or spines which cover the surface of the Echini, and the like, are scarcely developed in the star-fish, and are entirely wanting in others. By some naturalists the possession of *cirri*, or tendril-like tubes proceeding from the skin, has been thought to approach most nearly to a criterion of the class. But Dr. Carpenter has pointed out a more extensive agreement in the minute structure of the skeleton,—whether it consists of polygonal plates united at the edges, so as to form a complete envelope to the body, as in the *Echinus*,—or of a solid stem and branching arms, as in the *Crinoidea*,—or of a jointed flexible framework within a thick skin, as in the *Star-fish*,—or is only to be discovered in the rudimentary condition of scattered patches of calcareous deposit, as in the *Holothuria*, and its allies.

The elementary structure of the skeleton in this class may be described as a *net-work*, composed of calcareous and animal matter intimately united; the former, however, being greatly predominant. In this net-work, the interspaces or openings, and the solid structure which surrounds them, may bear an extremely variable proportion to one another. The predominance of the latter gives great solidity and strength to those parts of the skeleton where strength is principally required; whilst the texture is very loose and porous, with but a small amount of solid materials, and in those parts where the object is rather to fill up space. In either case, however, the strength of the whole is much greater than would be inferred from the apparent slightness of its intimate structure, as seen in a thin section. For the net-work is not on a single plane, but extends in all

directions, every part supporting every other part, and being supported by it in turn.

But this structure is seen to most advantage in the *spines* or prickles, with which the shell of the *Echinus* is beset. The strength of these organs is so increased by being connected with solid ribs or pillars, as to constitute a regular and distinct pattern, which appears to differ in every separate species. The spines are, for the most part, cylindrical or conical in their form; their transverse sections, therefore, are usually of a circular shape. Reduced to a sufficient thinness, and examined with the microscope, they exhibit a regular concentric arrangement, resembling that of an Exogenous stem, and proceeding from the same cause—the addition of successive layers, each on the outside of the preceding one. Each layer of the calcareous net-work is surrounded by a row of solid pillars or ribs, which may be seen running from end to end on the external surface of the spine; and as these are composed of a very transparent substance, their cross-sections might be mistaken at first sight for open spaces, in those species at least, in which the substance is colorless. In most cases, however, it is tinged with some decided hue. The brilliancy of these hues, when shown in a strong light, and the marvelous regularity and variety of the pattern, render these sections unattractive and even uncouth, in external appearance, as are the bodies from which they are derived, perhaps the most beautiful objects which the microscope has revealed to us. As much of beauty is found in the infinity of shapes and hues, as of exquisite fitness and harmony in the forms and structures of the new creation thus brought within our survey.

We have already alluded to the importance of the microscope to the geologist; how it has verified the true nature of fragmentary remains of the animals and plants of former epochs, and how it has shown us vast stratified deposits almost entirely made up of the accumulated remains of animals and plants which, even in their living state, were of microscopic minuteness. We still look forward to further discoveries in other cases, from a microscopic examination of rocks, at present believed to be inorganic. At the request of Mr. C. Darwin, Dr. Carpenter minutely examined the physical composition of the extensive calcareous deposit which covers the surface of the Pampas, and in which the remains of the great Megatheroid quadrupeds are imbedded; and compared it with the composition of the calca-

reous tufa now in progress of formation along the coast of Chili. The latter was found to be obviously composed in great part of fragments of shells, distinguishable by the naked eye: and the dense matrix in which they are imbedded is chiefly made up of minuter fragments, only distinguishable as such by the microscope; while the amorphous deposit of calcareous particles that cements the whole together, has every appearance of having been the result of the attrition or decomposition of the same organic structures. On examining the Pampas deposit, the principal part of it was found to be composed of amorphous particles, so similar in aspect to those of the Chilian rock that their identity could scarcely be doubted; whilst, scattered at wide intervals, were discovered particles of shell, distinctly recognizable by the microscope, though invisible to the naked eye. From these indications it seems a probable inference that the sources of both deposits were the same; but that the materials of the Pampas deposit had undergone a much greater degree of comminution than those of the Chilian rock. This inference agrees with Mr. Darwin's hypothesis, "that the Pampean formation was slowly accumulated at the mouth of the former estuary of the Plata, and in the sea adjoining it;" and appears to render it much more probable than M. D'Orbigny's theory of a great debacle, or Sir Woodbine Parish's idea of a fluvial deposit.*

We observe also in Mr. Williamson's microscopic analysis of the Levant mud, already alluded to, that he has been able to recognize minute fragments of the shells of Mollusca and Echinodermata, mingled with the Infusoria and Foraminifera, of which that deposit is chiefly composed; and it further appears, that fragments of this description form no inconsiderable proportion of some varieties of chalk. Dr. Carpenter's attention has recently been given to the minute examination of those vast deposits of Nummulitic Limestone in different parts of the world, which have been represented by many geologists as equivalent to the higher beds of chalk of Northern Europe; but which are now generally regarded as belonging to the earliest ages of the tertiary period. In a paper on this subject recently communicated to the Geological Society, Dr.

Carpenter has not only described an entirely new type of structure, presented by bodies which have been hitherto, for want of microscopic analysis, classed among the Nummulites; but he has also proved that the calcareous matrix in which the Nummulites and their allies are imbedded, and which forms a continuous strata of hundreds of miles in length and breadth, and sometimes of three thousand feet in thickness, is itself composed of the comminuted remains of similar bodies, mingled with the shells of minuter Foraminifera.

We undertook to demonstrate that the microscope, as an instrument of scientific research, is now fully entitled to take rank with the telescope; in virtue of its perfection as an optical instrument, of the new facts which it has brought under our cognizance, and of the comprehensive views which it has opened to us. The grandeur of these views must not be estimated by the space over which they extend, but by the conceptions to which they give rise in our minds. There is something indeed in the extremes of minuteness, which is no less wonderful,—we might almost say, no less majestic,—than in the extreme of vastness. If the mind loses itself in the contemplation of the immeasurable depths of space, and of the innumerable multitudes of stars and systems by which they are peopled, it is equally lost in wonder and admiration when its eye is turned to the countless multitude of living beings which a single drop of water may contain—to the wondrous succession of phenomena which every individual amongst them exhibits, and to the order and constancy which these phenomena present. Or, still more, when we direct its scrutiny to the penetration of that universe, which may be said to be included in the human body, (and now said with a meaning unknown to those ancient philosophers who first designated it as a *microcosm*,) and survey the innumerable assemblage of elementary parts, each having its own independent life, yet each working in perfect harmony with the rest, for the completion of their most significant yet most mysterious whole. In the study of the one class of phenomena, no less than in the survey of the other, are we led toward infinity; and in both alike, do we discern the orderly, uniform, and effectual ministration of a wise design, evolving the most varied and astonishing results from the co-operation of the most simple means.

* Darwin's Geological Observations on South America, p. 77.

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AGNES SOREL AND HER COTEMPORARIES.

AT the commencement of the fifteenth century, the long contests between the rival houses of Lorraine and Bar seemed likely to be terminated by the extinction of both families. The sole representative of the latter house was the Cardinal of Bar, an aged prelate; while the destinies of Lorraine hung on the life of a feeble infant, daughter of its chivalrous Duke, Charles, and his exalted consort, Margaret of Bavaria.

The little Isabelle, on whose frail existence so much depended, was tended, cherished, almost idolized, by her future subjects, as well as by her fond parents. As she grew in years and bodily vigor, the faculties of her precocious mind were developed under the judicious care of her wise mother and gifted father. Charles of Lorraine was the most accomplished prince of his day. He had proved himself a brave and skillful warrior in his campaigns in Germany and Hungary. He had commanded the forces of the Teutonic Knights in Prussia, and had been the main stay of the Hungarian monarch in his war with the Turks. The Duke of Lorraine was no less skilled in the arts of peace. A poet of no mean excellence, his refined and liberal mind, his elegant tastes, and his graceful and winning manners, are praised by the historiographers of his own time, who ever found a welcome at his hospitable court.

Under these beneficent influences the little Isabelle passed her childhood and early girlhood, not quite companionless, for her playmate from the cradle—to whom she was ever fondly attached—was the fair and gentle Agnes Sorel, whose singular adventures we are about to narrate.

The "Demoiselle de Fromenteau," as she was styled, though of very inferior rank to her friend, could scarcely be regarded as a dependant. Her father, the Seigneur de Saint Gérard, was attached to the service of the Count de Clermont; and his little Agnes was tended and educated by the Duke and Duchess of Lorraine with the same care as

their own daughter. In many traits of character the girls resembled each other. Agnes, who was the elder by one year, was remarkable for her gentleness and winning sweetness of deportment. Isabelle had more vivacity, and greater brilliancy. They were both beautiful, but the same distinction might be observed in the style of their personal charms. Isabelle, though without the shadow of vanity, pride, or hauteur, "looked every inch a queen;" the noble blood of the great Charlemagne flowed in her veins, and the high-born lady, destined to command, was apparent in every movement and gesture. Agnes has been likened to the "Madonna" of Raffaele. Her fair and slender form, her large, soft, pleading eyes, bespoke a soul gentle, timid, and trusting. Yet Agnes was not a weak or insipid character. The most accomplished woman of her day—the most delightful converser—so much so, that even at that epoch, so fruitful in illustrious ladies, she was looked on as a prodigy—she owed her great and enduring influence more to her mental qualities than to her personal attractions. She fascinated all who came within her sphere; and occupying, as she afterward did, a most anomalous and questionable position, she never made a personal enemy, but gained and retained the affectionate good-will of those who, we should naturally suppose, would have regarded her elevation to power and influence with envious and indignant feelings.

The aged Cardinal of Bar, feeling himself on the verge of the grave, anxiously desired to terminate, by a marriage between Isabelle and his grand-nephew René, the strife which had for generations been waged between the houses of Bar and Lorraine. The young prince, destined for this alliance, was the second son of Louis of Anjou and Yolande of Arragon, whose mother had been a princess of the house of Bar. The Cardinal had adopted and educated René, with the design of making him his heir, and had spared no pains to perfect him in those arts and exer-

cises befitting his high rank and future position; and although in some respects his nephew might scarcely aspire to the hand of the heiress of Lorraine, still, the pretensions of the young count were not inconsiderable. His sister, Marie, was married to the Dauphin Charles, heir-apparent to the crown of France. His father, titular King of Naples and Sicily, although he had failed in establishing himself in this inheritance, bequeathed by Queen Joanna, could yet transmit his title to these rich possessions, which his children might hope eventually to inherit. Influenced, perhaps, less by these considerations than by his personal merits, the Duke and Duchess declared themselves in favor of Rene's suit; and their youthful daughter became his bride ere she had attained her fifteenth year.

When Isabelle bade adieu to her native Lorraine, and accompanied her husband to Provence, she did not part from the friend of her girlhood. Agnes Sorel shared the joys, and sympathized in the sorrows of her wedded life. At first the horizon was bright and cloudless. Isabelle, who was ever an adored wife, became the proud mother of four children, "the most beautiful ever seen"—so the contemporary chroniclers assure us; but when her father's death made her heiress of Lorraine, the gathering clouds of war, and its attendant miseries, cast their lurid shadows around her: her cousin, Antoine de Vandemont, contested the succession, asserting that Lorraine was too noble a fief to descend to a female. Singularly enough, the question had never before arisen: Charles of Lorraine was the first prince who had not left behind him male heirs. The Duke of Burgundy supported the claims of Antoine de Vandemont; and Rene, after bravely fighting for the inheritance of his wife, was taken prisoner at the battle of Bulligneville, and condemned to a rigorous captivity in the castle of Dijon.

This fatal battle was lost by the rash impetuosity of the young nobles of Lorraine and Bar, who fought in the ranks of their Duke Rene. The veteran general Barbazan had earnestly entreated his master to act on the defensive.

"Quand on a peur des feuilles, il ne faut pas aller au bois," said a young gallant, contemptuously.

"Ces paroles ne sont pas pour moi," replied the brave old soldier; "Dieu merci, j'ai toujours vécu sans reproche; et encore aujourd'hui on verra si c'est la crainte ou le bon conseil qui me font parler de la sorte."

The result justified his prediction: Rene, having done all that a brave man could do, and received many honorable wounds, fell into the hands of his enemy. When Isabelle learned the tidings of this disastrous fight, and heard that her beloved lord was in captivity, she hastened to Chinon, to entreat Charles's aid and mediation with the Duke of Burgundy to procure the freedom of her husband. But Rene owed his liberation from captivity to a more romantic cause than the intercession of his royal brother-in-law. Philip of Burgundy, having visited his captive, found him employed in painting. Rene had executed on glass very charming and faithful portraits of Philip and his father, Jean-sans-peur. The kind-hearted Duke was touched and interested: he conversed frequently with the accomplished prince, and restored to him his liberty, only stipulating that he should surrender himself a captive the following year, if the conditions annexed as the price of his freedom should not have been complied with.

The visit of Isabelle to Chinon was, nevertheless, productive of important results. Agnes Sorel had accompanied her; and, in the interview which the princess of Lorraine and Bar had with the Sovereign, the grace and beauty of the "Demoiselle de Fromenteau" struck the ardent fancy of the young Charles. The impression she had made was observed by the wife and mother-in-law of the king. The latter, Yolande of Anjou, was a woman of masculine mind; she swayed the careless monarch, and, unconsciously to him, had long guided his counsels. The passion alike of Yolande, of her daughter, Queen Marie, and of the beautiful stranger, was patriotism. France was in subjection. Charles its king, and who ought to have been its deliverer, was insensible of its dishonor, or too much devoted to pleasure, to make the necessary exertion for his country's safety. Marie, beautiful and amiable, was not beloved. The influence which alone could stir Charles to noble resolves, should spring from a passion which Yolande perceived her daughter could never excite. She conceived the singular, we may say the unexampled design of exciting it by the charms of Agnes Sorel. Wonderful force of the sentiment of love of country! Marie, stranger still to record, assented. Hopeless herself of influencing Charles through his affections, and quite conscious of his passion for the beautiful stranger, Queen Marie listened without disapproval to the suggestions of the vigorous-minded Yolande, that they should wean the voluptuous monarch from his effeminate in-

dolence and unworthy favoritism, by giving him as companion and friend, one who, they both saw, was gifted with a high and commanding intellect, and a gentle nature and constant heart. Surely we cannot wonder that such an age was rich in noble enthusiasm, when it witnessed a sacrifice of pride and feeling so extraordinary in persons so exalted. The disinterestedness of friendship has nothing to compare with this astonishing instance of patriotic devotion. But still we must not estimate the sacrifice at more than, in truth, it was worth; or suppose even these heroines capable of impossibilities. Marie had had frequent occasion to lament her husband's infidelities; her conjugal love could not be further outraged by the substitution of a comparatively virtuous attachment for those ephemeral amors which had hitherto marred the happiness of her wedded life. That influence over the mind of Charles which she had failed in securing might, the fondly hoped, be so wielded by the beautiful and *spirituelle* friend of the high-minded Isabelle of Lorraine, as to change the destinies of the hapless realm of France. She asked from her brother's wife permission to promote the fair Agnes to be her maid of honor. Isabelle felt keenly the unavoidable separation from her friend, should she yield to the Queen's entreaties; but she could not allow her selfish affection to be a barrier to the advancement of Agnes Sorel. The young girl, ignorant of all that was designed for her, was from thenceforth to live at court, attached to the person of Marie of Anjou, who even personally had conceived a warm regard for one whom she designed to make, if possible, her own rival.

Queen Yolande, for she was titular sovereign of the two Sicilies, was a far-sighted and ambitious woman, unscrupulous, as we have seen, in the choice of means which might enable her to obtain a desired end. When the fortunes of Charles were at their lowest ebb, she had never despaired, but courageously cheered and animated him to exertion. Let us cast a rapid glance at Charles's past career. The imbecility of his father, King Charles VI., and the hatred which his unnatural mother had conceived for him, had made the Dauphin, in his earlier, an outcast from the sweet charities of home. The tragical murder of Jean-sans-peur of Burgundy, on the bridge of Montrebeau, had drawn down on his head the intense hatred of the Burgundian party, then the most powerful in France. Well might Francis I. exclaim, when he gazed, in the

Chartreuse of Dijon, on the effigy of the murdered duke, "Through that gash," pointing to the wound which disfigured the forehead, "the English entered France!" The Dauphin always asserted, probably with truth, that he was innocent of this foul murder. Tannegui du Chatel struck the fatal blow; but Charles had expressly invited the Duke of Burgundy to this ill-fated conference, and the assassination was accomplished in his presence. Philip le Bon, son of the murdered Duke, thirsting for revenge, threw the weight of his vast power and influence into the opposing scale, and allied himself with the enemies of his country to revenge his father's death. By the conference at Arras (1419) he paved the way for the infamous treaty of Troyes (1420), which disinherited the Dauphin, and transferred the royal diadem to the English invader, Henry V. In the treaty, by which Charles VI. thus disowned his son, the following insulting clause occurs, which must have been peculiarly galling to the Dauphin:—

"Considérant les horribles et énormes crimes et délits commis par Charles, soi-disant Dauphin de Viennois, il est accordé que nous, notre dit fils le roi, et aussi notre trèscher fils Philippe, Duc de Bourgoyne, nous ne traiterons aucunement de paix et de concorde avec le dit Charles, si non du consentement et du conseil de tous et de chacun de nous trois, et des trois états du royaume."

Two years later and the Dauphin found himself King, though he had but a scanty territory, and few adherents. The imbecile Charles had breathed his last. The victorious Henry had also been snatched away by the unsparing hand of the destroyer. Paris and the northern provinces were, however, held for the young Henry VI., by his uncle, the brave Duke of Bedford. Charles VII. could only establish his court on the southern bank of the Loire; and even there he scarcely felt his position secure. "Le petit Roi de Bourges," was the name contemptuously given to him by the English. Charles "le Victorieux," Charles "le Bien Servi," were titles which he could triumphantly claim, not many years later. His wondrous success is to be ascribed, not to his personal exertions, for he was, as has been intimated, indolent and excessively addicted to pleasure, but to the discriminating wisdom, or rather instinct, with which he chose his counsellors. He had the art, or the good luck, to gather around him and attach to his cause the greatest captains of the age, and the wisest and most far-sighted

politicians ; and, notwithstanding his indolent habits, had the good sense to profit by their counsels and services. We have only to mention the names of "the brave Dunois," the Comte de Richemont, La Hire, Saint-railles, &c., who conducted his military operations ; in the diplomatic department the sagacious Yolande of Anjou, Jacques Bureau, and his brother Gaspard, who created for him the most effective artillery in Europe ; and in finance, that most skillful of exchequer-chancellors, Jacques Cœur.

Yolande seems to have understood fully the character of her son-in-law. She knew him to be of an affectionate and trusting nature, and peculiarly sensitive to the refined charms of female society. He was capable of appreciating all that is excellent in the character of woman—her heroism—her generous abnegation of self—her enduring devotion. Yolande artfully availed herself of these influences. Unseen herself, she was, as we have already observed, the guiding hand which influenced Charles throughout his entire career, and through him the destinies of France. Her daughter, Queen Marie, was a very superior woman, amiable, accomplished, generous, and gentle ; but she never possessed her husband's affections, though her conduct secured his esteem and respect. Stimulated by her mother, she strenuously labored to make the King lay aside his besetting sin of indolence, and act with vigor against the English. Fortune seemed invariably to desert the banner of the lawful sovereign, and Charles found his best generals and bravest troops so often defeated that his friends lost hope and confidence, and his dispirited soldiery deserted their colors.

While the Dauphin remained inactive at Chinon, Orleans, his principal stronghold on the Loire, was closely invested by the English. Dunois, and others of his brave adherents, had thrown themselves into the beleaguered city ; but with slender hope of making a successful resistance to the besieging host. In this extremity of Charles's—or rather of Yolande's—fortunes (for it was she who in truth had so far fought the battle of French independence) another still more heroic French-woman suddenly appeared on the stage. Commissioned from on high, as she believed—to rescue her native land from foreign invaders—to raise the siege of Orleans, and see her King crowned at Rheims—Jeanne D'Arc, the simple shepherd-girl of Domremi, presented herself to Charles at Chinon. Yolande saw, and at a glance com-

prehended her enthusiasm. Perhaps, too, she credited her mission : at all events, she sympathized in her patriotic fervor ; and lost no time in communicating a share of her sympathy to Charles. Jeanne's divine commission was recognized. Accoutred in armor, and girt with the sword of Saint Catherine de Fierbois, she threw herself into Orleans. Her enthusiasm, her pious fervor, and her conviction of a triumphant accomplishment of her mission, inspired the garrison with new courage. Now here, now there ; successive sallies from the beleaguered city fell with the speed and destruction of lightning on the English outposts. A being partaking of the character of an angel and a prophetess headed these unexpected and terrible attacks. The superstitious terrors of the English were alarmed. Seven days after Jeanne entered Orleans, the siege was raised, and the English were in full retreat toward the Seine. So far, the mission sped prosperously ; she had now to retrieve her undertaking to see Charles placed on the throne of his ancestors in the old kingly capital of Rheims ; but to carry him thither through a hostile country, every stronghold of which was in the hands of his enemies, was even a more difficult achievement than the relief of Orleans. However, Jeanne's own belief in her preternatural mission had now spread far and wide, and those who at first had probably used her as an adventuress, now followed her as a heaven-inspired guide. The expedition to Rheims was undertaken—every obstacle gave way before the enthusiasm of Charles's followers. Rheims, after a progress as triumphant as dangerous, was gained ; and the consecrated oil, which would insure the validity of his title in the eyes of all true Frenchmen, was at length poured on the head of King Charles the Seventh. As Charles kneeled by the high altar, Jeanne "la Pucelle" stood by his side, leaning on her snow-white banner, spotted with the fleur-de-lis of France, on which was represented the Saviour of the world, with the simple inscription, *Jhesus Maria*. "It had shared the danger," she said ; "it was meet that it should share the glory."

There are probably few persons who are not familiar with that exquisite impersonation of Jeanne D'Arc, for which we are indebted to the chisel of a second "Maid of Orleans." The princess Marie of Wirtemberg, daughter to the ex-King of the French, has represented her in the garb so minutely described by contemporary writers, "armée tout en blanc, sauf la teste, une petite hache en sa

main;" leaning on the sword in form of the cross; her fair head bowed, and her features expressing resolution, blended with repose. Her mission was now accomplished: she fell at her monarch's feet bathed in tears. "Gentil roi," she said, addressing him, "or est exécuté le plaisir de Dieu, qui voulait que vous vinssiez à Rheims, recevoir votre digne sacre, pour montrer que vous êtes vrai roi, et celui auquel doit appartenir le royaume."

Jeanne now longed to return to her simple pastoral life, and her native village. She confided her wishes to Dunois. "Je voudrais bien que le gentil roi voulût me faire ramener auprès de mes père et mère qui auraient tant de joie à me revoir. Je garderais leurs brébis et bétail, et ferais ce que j'avais coutume de faire." The only acknowledgment of her services which she demanded, was the exemption from taxation of her native village. Until the revolution of 1793, *Neant à cause de la Pucelle* was entered opposite the name of Domremi, in the books of the taxing officer for that district of Lorraine.

But alas! for Jeanne; a far different destiny awaited her. The market-place of Rouen witnessed a tragedy which, merely to read of, has "drawn iron tears" from many a manly breast. The pure, the meek heroine, who had done such great things for "the pity" she had for the realm of France, was here to expiate the crime of patriotism by the punishment of witchcraft. Her infamous judge, Cauchon, Bishop of Beauvais, condemned her to be burnt alive. "Helas!" she exclaimed, when she heard her sentence, "reduire en cendres mon corps qui est pur, et n'a rien de corrompu, c'est un horrible supplice!" As the priest who attended her dismounted from the scaffold, when the executioner was about to apply his torch, she said to him, "Tenez-vous en bas, levez la croix devant moi, que je la voie en mourant, et dites-moi de pieuses paroles jusqu'à la fin." Her last utterance was, "Jesus!"

Chinon, where Charles held his little court, is a place familiar, at least by name, to most of us, its castle being a favorite residence of our English sovereigns of the race of Plantagenet. Its situation is picturesque and imposing; planted on an elevated platform of rock overhanging the Loire, and commanding its junction with the Vienne, surrounded by the verdant woods and rich pasture-land of Touraine, the "garden of France." The ruins, which are considerable in extent, are of great interest, recalling the stirring times

of the crusaders, and, a few centuries later, the wrongs and sufferings of the Knights Templars, whose grand master, the heroic Jacques de Molay, was immolated within its walls. The adjoining monastery of Fontevrault—founded by the devoted enthusiast Robert D'Arbrissol, who, following the example of his Divine Master, preached repentance and forgiveness to the "chiefest of sinners," and by his eloquent and heartfelt exhortations reclaimed from vice innumerable Magdalens, miserable outcasts from society, and hopeless, until he proclaimed to them the message of mercy, of forgiveness from God or man,—this noble and beautiful house of Fontevrault contains the mortal remains of the heroic Cœur-de-Lion.

At a short distance from Chinon stood the Maison Robardeau. This was now to become the residence of Agnes Sorel. The scandal of that day reported, and possibly with truth, that Robardeau was connected with the castle where the monarch held his court, by an underground passage.

Charles possessed many qualities which fitted him to captivate the imagination and win the affections of a young and susceptible heart. His features were regular, beautiful alike in form and expression; though his *tout ensemble* was not effective from his want of height. He had a heart warm and devoted, manners gay and fascinating, a mind well cultivated, and elegant tastes. He was personally brave, though his love of pleasure, as well as a natural prudence, deterred him on many occasions from leading his armies in person to battle or victory. But, above all, he had at first sight conceived, and always afterward cherished for the fair Agnes, an impassioned and unswerving attachment, which ended only with life. The young girl long resisted his suit, though she also loved in return; but she was in the midst of influences and inducements, such as perhaps never before or since solicited a woman to dishonor, and her weak woman's heart at last yielded.

When Agnes Sorel forfeited the approval of conscience—the calm dignity of her hitherto pure and spotless life—she forfeited also the happiness she had till then enjoyed. Never more, after such a fall, does Nature unfold her charms, as in the days of bright childhood, or happy and innocent girlhood—

"As I wandered free,

In every field for me

Its thousand flowers were blowing;

A veil through which I did not see—

A thin veil, o'er the world was thrown

In every bud, a mystery ;
 Magic, in every thing unknown.
 The field, the air, the grove was haunted,
 And all that age has disenchanted.
 Yes! give me—give me back the days of
 youth,
 Poor, yet how rich!—my glad inheritance,
 The inextinguishable love of truth,
 While life's realities were all romance."

—now the murky shadows of sin have obscured the happy vision—conscious guilt is the great disenchanter. How keenly Agnes felt her position, is evinced by the brief records of her words and feelings which have been handed down in history. Of her death-bed penitence we shall speak hereafter. Yet she had everything in the present, if we except the approval of her conscience, to make life dear to her. He whom she loved so fondly, and to whom she had dedicated her entire existence, repaid by the most fervent and constant devotion the sacrifice she had made for his sake. France, perhaps, an almost equal object of adoration, sprang up in freedom and power under the administration which she helped to guide. No woman was ever more truly loved. For twenty years—until death separated them—Charles never swerved in his attachment for his "good and gentle Agnes." The honors and splendors of this world were lavishly showered on her; yet she "bore her faculties so meekly," that she made no enemies, but could boast of many and faithful friends. The Queen loved her as a sister. The contemporary chroniclers vie with one another in eulogizing her wisdom and goodness—some of them, in their zeal for her virtue, denying even the nature of her connection with the King. All-powerful and beloved, she could find but one faint consolation for the loss of her innocence—promoting the happiness of others, and exercising her vast influence with the King for the honor of her country, by urging him to complete the emancipation of his kingdom from its foreign foes. At the time when his fortunes were most desperate, she had placed at his disposal all her wealth, in jewels or money, for the payment of his troops.

"Hier sind Juwelen—Schmelzt mein Silber
 ein—
 Verkauft, verpfändet meine Schlösser—Leihet
 Auf meine Güter in Provence—Macht Alles
 Zu Gelde und befriediget die Truppen!"

Well might the enamored monarch feel the sentiments of grateful admiration for these disinterested services of his fair Agnes,

which Schiller has made him utter so nobly:—

"———— Zieren würde sie
 Den ersten Thron der Welt—doch sie verschmäh
 ihn,
 Nur meine Liebe will sie seyn und heissen.
 Erlanbte sie mir jemals ein Geschenk
 Von höherm Werth, als eine frühe Blume
 Im Winter oder seltne Frucht! Von mir
 Nimmt sie kein Opfer an, und bringt mir alle!
 Wagt ihren ganzen Reichthum und Besitz
 Grossmüthig an mein untersinkend Glück."

An anecdote has been transmitted to us, which illustrates her playful yet judicious interference in the military measures of Charles the Seventh. An astrologer, in whose predictions the monarch placed much reliance, was closeted with him on one occasion when Agnes was present. Charles, discouraged by some recent failures, and the predictions of the soothsayer, was more than ordinarily disheartened, and disposed to inaction—Agnes interrupted the conference by extending her hand to the magician: "I also would read my destiny," she said. "Madam, you will be beloved by the greatest monarch in Europe," readily replied the flattering astrologer, well aware of her relation to the King. Charles smiled at the implied compliment to himself; but Agnes rose, and playfully addressed him—"Will your Majesty grant me your royal safe conduct, for I would not willingly run counter to my destiny," she said, archly. "I must go to the King of England, for I see clearly he is the greatest monarch, since he retains, in addition to his own dominions, the richest provinces of France, from which its sovereign makes no effort to dislodge him, fearing, it would seem, to assert his legitimate claim." Charles blushed under the merited, though sportive rebuke. Such a persuasive Mentor seldom spoke in vain: but her influence was most practically felt by bringing, as with extraordinary sagacity she did, under the notice of the King, brave knights and skillful warriors, whose courage and prudence achieved many a victory for the national cause.

Charles made his first entry into Paris in the November of 1437. The procession which accompanied him was truly splendid; and the details are dwelt on with the utmost minuteness by contemporary writers. A thousand archers, some of them composing Charles's body-guard, led the way; then rode the King, clad in brilliant silver armor—the trappings of his noble steed were of blue

velvet which swept the ground, embroidered with fleur-de-lis. The Queen was also splendidly attired; but as far surpassing her in magnificence, as she did in beauty, Agnes Sorel rode by her side. The only weakness recorded of "la belle des belles," is her fondness for sumptuous dress; and the only unamiable speech she was ever heard to utter was on this occasion. The Parisians murmured when they beheld her costly and rich costume, excelling in splendor that of the rightful and justly popular queen. "Les Parisiens ne sont que vilains," she, contemptuously, exclaimed: "et si j'avais su qu'ils ne m'eussent pas fait plus d'honneurs, je n'aurais jamais mis le pied dans leur ville." But to return from the offended and pettish beauty. The royal pages, the nobles of the household, and the young dauphin, afterward Louis the Eleventh, succeeded, and the procession was closed by a corps of one thousand men-at-arms, the élite of the French armies, headed by their gallant commander, the Count de Dunois. His armor was sparkling with gold and silver, and surpassed in splendor that of the monarch himself. The populace were not behindhand in their preparations. We can scarcely refrain from smiling when we read of their arrangements for an effective reception of the King, now, for the first time, entering his capital. The seven cardinal virtues, and the seven cardinal sins, met him on the threshold, if we may so speak; then, on various platforms which lined the way, were represented those mysteries, or sacred dramas, which had for the middle ages such significant import, and were so popular with all classes. The preaching of St. John the Baptist, the nativity of the Saviour, the adoration of the shepherds, the passion, crucifixion, and resurrection of our Lord, were all represented: even the despairing Judas figured aloft, apparently hanging himself in his hopeless grief.

A short time previously, the Dauphin Louis had wedded the young Margaret of Scotland, daughter to the chivalrous James I. This princess, then only in her twelfth year, was fondly loved by her mother-in-law, Queen Marie, who lavished on the gifted and interesting Dauphiness that tenderness which even her maternal breast could not feel for the wayward and unamiable Louis. The young couple were from the first unhappy. This jealous, crafty, intriguing young man, "mauvais fils, mauvais père, mauvais frère, mauvais sujet, mauvais allié, mauvais mari, et ennemi dangereux," was indeed ill-matched with the ardent, susceptible, and romantic

Scottish princess. Margaret found her sole happiness in the mutual affection which subsisted between her, her mother-in-law, and the gentle Agnes. These high-souled women passed many blissful hours together, cultivating those elegant tastes in which they alike found solace and enjoyment. Margaret in particular had inherited from her father, the royal poet of Scotland, a genius and feeling for this refining art. She spent her nights in composing ballads, which seem to have been not unworthy of the daughter of him who sang "The King's Quhair." Her patronage of men of genius was liberal and discriminating. A little incident connected with Alain Chartier may be worth recording. Passing through one of the saloons in the palace, she perceived the poet asleep on a chair. To the astonishment of the ladies who attended her, she softly approached him, and kissed his lips. In reply to their amazed glances she said to them—"Ce n'est point à l'homme que je donnai un baiser, c'est à la bouche d'où sortent de si belles paroles."

Soon after her marriage, her royal father, too enlightened for a barbarous age, perished the victim of a villainous treachery. Here, too, we are among the records of the loyalty and heroism of women. It was in resisting the approach of James's assassins that the noble Catherine Douglas thrust her own fair arm into the bolt-rings of the door, and kept it so fastened until the brutal murderers broke the bone. Margaret herself bade adieu to life ere she had attained her twenty-first year. Young as she was, existence had long been distasteful to her. She has been accused of having voluntarily injured her health by eating in excess unripe fruits and other acids, with the design of preventing herself from becoming the mother of children to so hateful a husband. In her last illness, when those around her expressed hopes of her recovery, she shudderingly exclaimed, "Fi de la vie, qu'on ne m'en parle plus!"

The death of the hapless Dauphiness deeply impressed the mind of Agnes Sorel, who, soon after, asked and obtained permission from the King to retire from court. She chose for the scene of her seclusion the castle which Charles had built for her in the neighborhood of Loches, and in the architectural details of which may yet be seen the device ^A (A *Sur-elle*), which identifies it with

her name. She selected it in preference to her more picturesque château of Beauté Sur Marne—that romantic spot, formerly the favorite retreat of the murdered Louis of Or-

leans, father to her friend the Count de Dunois—because she proposed to herself to spend the remaining years of her life in devotional exercises; and in the canons of Loches—to whose cathedral she had ever proved a liberal patroness—she hoped to find pious and worthy instructors.

Agnes Sorel was still in the prime of life—she was thirty-six—when she voluntarily parted from her royal and still faithful lover. She had the consolation of reflecting that, during the fifteen years she had influenced his mind and his counsels, she had been the disinterested advocate of all that was “worthy and of good report.” She left him surrounded by tried and faithful friends, most of them attached to his cause by her influence and exertions. Jacques Cœur, the goldsmith of Bourges—whose vast monetary resources, acquired by his trade in the East, through her instrumentality had been placed at the disposal of the monarch, and had mainly conduced to the successful issue of his warlike undertakings—was her tried and dearest friend. She had named him the executor of her will, in which she had devised all her wealth to pious uses. For five years longer she was all-powerful with the King, who frequently visited her, and took counsel with her on affairs of state. His peace during these years was disturbed by the machinations of the Dauphin, who took every possible opportunity of annoying his father, and thwarting his projects. One grievance, on which he frequently insisted—his only real one—was the insult shown to his mother by the elevation of Agnes Sorel, toward whom he manifested an irreconcilable hostility. As for the meek Queen, when reminded of her wrongs, she would only answer, “C’est mon seigneur; il a tout pouvoir sur mes actions, et moi aucun sur les siennes.” She well knew, in truth, that the influence which the Lady of Beauté exercised over his mind was exercised in her favor, and was beneficial to her, as well as to the interests of the kingdom.

In the winter of 1449–50, Charles, who had recently subjugated Normandy, took up his abode in the Abbey of Jumieges. The cold was intense; this inclement season in France had never brought more severe and dreary weather. He was surprised to receive an unannounced visit from his fair Agnes. She had left Loches, and braved the winter’s snow, to warn him of a conspiracy which might endanger his life, and in which the rebellious Dauphin was prime mover. Having conveyed her precautionary warning, she re-

tired to the neighboring hamlet of Mesnil, where she was seized by sudden and alarming illness. Her health, which had long been delicate, had been impaired by the trying journey she had just accomplished. She felt—with that intuitive perception which is given to many on the brink of eternity—that the grave would soon open its portals to receive her; and that she must prepare for her pilgrimage to that “bourne whence no traveler returns.” Her agonies of mind and body were intense. She reviewed, with self-unbraiding, her past life: lamented the fatal gift of beauty, but for which she might have accomplished her youth’s early promise; lived in innocent happiness, and died in peace. To the Count de Tancarville, who stood by her death-bed, she spoke of her fears for the future: nor could she gain a moment’s tranquillity, but by reflecting on the mercy shown by the Savior to Mary Magdalen, the woman who, like her, was “a great sinner.” She repeated, incessantly, passages from the confessions of St. Bernard, which she had copied with her own hand, feeling that they were applicable to her case. At length, exhausted by mental and bodily suffering, she breathed her last sigh in the arms of the King. Her heart was bequeathed to the monks of Jumieges; her body was interred in the middle of the choir of the cathedral church at Loches, where a beautiful monument was erected to her memory by her royal lover. She is represented in a recumbent posture; graceful drapery veils her figure, and a circlet round her brow confines her flowing tresses; angels, with extended wings, hover, as if waiting to convey to heaven the prayer which her clasped hands and half-parted lips seem to express; while two lambs, emblems of meekness and gentleness, lie passively crouched at her feet. The inscription is simple:—

“Cy git noble Demoiselle Agnes Seurelle en son vivant Dame de Beauté de Roquese-rein, d’Essoudun, et de Vernon-sur-Seine, piteuse envers toutes gens, et qui largement donnoit de ses biens aux églises et aux pauvres; laquelle trépassa le 9^{iem} jour de Fevrier, l’an de grace 1449. Priez Dieu pour l’âme d’elle. Amen.”

It may seem a paradox to speak of the *virtuous mistress* of Charles the Seventh; and posterity—even allowing for the frailties and errors of fallible human nature—might still pronounce an unfavorable verdict on the character and conduct of Agnes Sorel, were it not for the negative evidence given in her

favor by the contrast which is apparent in the actions of Charles during the twenty years in which her influence was paramount; and his conduct after her death. Then, as in his early youth, he abandoned himself to sensual indulgencies. No longer conceding to his amiable Queen that respect and consideration she so well merited, he treated her with harsh and cruel neglect. He became unmindful of his friends, and ungratefully dismissed them at the suit of newer and unworthy favorites.

Jacques Cœur, to whom he owed so much, was the first who fell under his displeasure, or rather, we should say, his indifference, and he basely left him to fall a prey to his personal enemies. The great money-changer of Bourges had amassed, for that day, enormous riches. He had been a successful trader in the Levant; his argosies rode, richly laden with the treasures of the East, in all the southern harbors of France. In his commercial establishment he had three hundred factors receiving their orders from him, and devoted to his interests. His seigneurie of St. Fargeau enclosed twenty-two parishes. His house at Bourges still remains a monument of his rich and elegant taste in architecture. The King was his debtor to an enormous amount. When Charles undertook the conquest of Normandy in 1448, Jacques Cœur advanced him 200,000 crowns of gold, and entertained four armies at his own expense. "Il est aussi riche que Jacques Cœur," was a common proverb. The people believed that he had discovered the philosopher's stone, and could thus transmute the baser metals into pure gold. But the secret of his success was less magical; may we not trace it in the punning device which yet stands, carved in bold relief, on his house at Bourges—"A VAILLANS (cœurs) RIEN IMPOSSIBLE." Truly the omnipotence of Will is great. He who steadily resolves, and bends every energy to obtain the prize, whatever it may be, which he proposes to himself, runs but little chance of failure. Still, when success has been attained, how often does it fail to give the happiness and satisfaction which its possessor looked for? So was it with Jacques Cœur. The sunshine of his prosperity brought forth the adder.

Soon after the death of Agnes Sorel, Chabannes, one of the enemies whom his riches had excited, being high in the favor of the King, obtained his consent to a "proces" against the goldsmith of Bourges. One of the absurd charges brought against him was, that he had poisoned his constant and true

friend, the fair and gentle Lady of Beauté! With base injustice, Charles made his accuser his judge. After an indecent proceeding, in which every form of justice was violated, Jacques Cœur was condemned to perpetual banishment, with confiscation of his goods, in addition to a fine of 400,000 crowns to the royal coffers. The persecuted man fled to Rome, stripped of the wealth which he had acquired by the unremitting industry of years. He found the pontiff, Nicholas the Fifth, about to dispatch a fleet against the Turks, and solicited the command, which was readily granted him. But before his voyage was completed he fell sick, and died at Chio, where his mortal remains repose in a church of the Cordeliers. Popular rumor in France long refused credence to the tidings of his death. In the belief of many he lived to amass, anew, riches no less considerable than the fortune he had been stripped of in France with such cruel injustice.

We must not close our notice of Agnes Sorel without reverting to the fate of her early playmate, Isabelle of Lorraine. She died long before her friend—having survived her sons, who were snatched from her ere they had attained the age of manhood. Her daughters, Yolande and Margaret, were celebrated for their charms, as the latter afterward became for her sorrows and misfortunes. Yolande was betrothed to Ferry, son of Antoine de Vandemont, who had so long contested with René the succession to Lorraine: and part of the disputed territory was settled on the young couple. Margaret, when scarcely fifteen, was solicited in marriage by Henry the Sixth of England; and one of the last occasions on which Agnes Sorel appeared in public, was the ceremony of the espousals at Nanci. "La Belle des Belles" was, as usual, sumptuously attired, and her presence was considered to give great éclat to the scene. When the youthful bride bade adieu to her native land, the King tenderly embraced her: "I seem to have done little for you, my niece," he said, addressing her, "in placing you on one of the mightiest thrones in Europe, for it is not worthy of possessing you." Poor Margaret could then but little anticipate the destiny that awaited her; doomed as she was to return to France, a heart-broken widow, a childless mother, a fallen and dis-crowned Queen—a suppliant for the penurious charity of others; her beauty gone, her hopes blighted; waiting and longing until her weary pilgrimage on earth should be accomplished and ended.

The last hours of King Charles were scarcely less wretched. He survived his once-loved Agnes eleven years—a sufficient time to prove to himself and to others, how utterly he was unworthy of her devoted and faithful love. No constant friend stood by his death-bed, or received his last sigh. He died from starvation!—fearing to partake of food, sustenance, or medicine, lest poison should be conveyed in them. His own son was the virtual parricide who thus hastened his end, and whose emissaries he dreaded in all those that surrounded him.

On the accession of Louis the Eleventh, the monks of Loches, anxious to propitiate the new sovereign, who had shown such rancorous hostility to Agnes Sorel, requested his permission to remove her monument, which, as we have stated, stood in the choir of their cathedral; alleging the scandal which it caused them in their devotions. “I respect your scruples,” replied the sneering Louis, “and grant you the permission you desire. Of course, you will not hesitate to

reinstate in my coffers the large sums of money with which Agnes Sorel endowed you, and which it would be a sin against your tender consciences any longer to retain.”

The character of Agnes Sorel has since met with a juster appreciation. In the chapter-house of this very Cathedral of Loches is preserved a manuscript, containing one thousand sonnets or poems in her praise; most of them being acrostics on her name. When Francis the First, many years afterward, gazed at the portrait of the Lady of Beauté, he expressed in the following lines, which he wrote underneath it, his sense of the services she had rendered her country, and her consequent claims to the gratitude of patriotic Frenchmen:—

“Gentille Agnès, plus d’honneur tu merites
(La cause étant de France recouvrer),
Que-ce que peut, dedans un cloître ouvrer
L’ause nonain ou bien dévot hermite.”

M. N.

From Fraser's Magazine.

AMERICAN POETRY.

AFTER the Americans had established their political nationality beyond cavil, and taken a positive rank among the powers of the civilized world, they still remained subject to the reproach, that in the worlds of Art, Science, and Literature, they had no national existence. Admitting, or, at any rate, feeling, the truth of this taunt, they bestirred themselves resolutely to produce a practical refutation of it. Their first and fullest success was, as might be expected from their notoriously utilitarian character, in practical inventions. In oratory, notwithstanding a tendency to more than Milesian floridness and hyperbole, they have taken no mean stand among the free nations of Christendom. In history, despite the disadvantages arising from the scarcity of large libraries, old records, and other appliances of the historiographer, they have produced some books which are acknowledged to be well worthy a place among our standard works, and which have acquired, not merely an English, but a Continental reputation. In the fine arts, notwithstanding obviously still greater impediments—the want at home, not only of great galleries and collections, but of the thousand

little symbols and associations that help to educate the artist—the consequent necessity of going abroad to seek all that the student requires—they have still made laudable progress. The paintings of Washington Allston are the most noteworthy lions in Boston; the statues of Powers command admiration even in London. In prose fiction, the sweet sketches of Irving have acquired renown second only to that of the agreeable essayists whom he took for his models, while the Indian and naval romances of Cooper are purchased at liberal prices by the chary bibliopoles of England, and introduced to the Parisian public by the same hand which translated Walter Scott. In poetry alone they are still palpably inferior: no world-renowned minstrel has yet arisen in the New Atlantis, and the number of those versifiers who have attained a decided name and place among the lighter English literature of their day, or whose claims to the title of poet are acknowledged in all sections of their own country, is but small.

If we come to inquire into the causes of this deficiency, we are apt at first to light upon several reasons why it should *not* exist.

In the first place, there is nothing unpoetical about the country itself, but everything highly the reverse. All its antecedents and traditions, its discovery, its early inhabitants, its first settlement by civilized men, are eminently romantic. It is not wanting in battle-grounds, or in spots hallowed by recollections and associations of patriots and sages. The magnificence of its scenery is well known. The rivers of America are at the same time the most beautiful and the most majestic in the world: the sky of America, though dissimilar in hue, may vie in loveliness with the sky of Italy. No one who has floated down the glorious Hudson (even amid all the un-ideal associations of a gigantic American steamer), who has watched the snowy sails—so different from the tarry, smoky canvas of European craft—that speck that clear water; who has noticed the faultless azure and snow of the heaven above, suggesting the highest idea of purity, the frowning cliffs that palisade the shore, and the rich masses of foliage that overhang them, tinged a thousand dyes by the early autumn frost—no one who has observed all this, can doubt the poetic capabilities of the land.

A seeming solution, indeed, presents itself in the business, utilitarian character of the people; and this solution would probably be immediately accepted by very many of our readers. Brother Jonathan thinks and talks of cotton, and flour, and dollars, and the ups and downs of stocks. Poetry *doesn't pay*: he cannot appreciate, and does not care for it. "Let me get something for myself," he says, like the churl in Theocritus. "Let the gods whom he invokes reward the poet. What do we want with more verse? We have Milton and Shakspeare (whether we read them or not). He is the poet for me who asks me for nothing;" and so the poor Muses wither (or as Jonathan himself might say, *will*) away, and perish from inanition and lack of sympathy. Very plausible; but now for the paradox. So far from disliking, or underrating, or being indifferent to poetry, the American public is the most eager devourer of it, in any quantity, and of any quality; nor is there any country in which a limited capital of inspiration will go farther. Let us suppose two persons, both equally unknown, putting forth a volume of poems on each side of the Atlantic; decidedly the chances are, that the American candidate for poetic fame will find more readers, and more encouragement in his country, than the British in his. Very copious editions of the standard

English poets are sold every year, generally in a form adapted to the purses of the million; to further which end they are frequently bound two or three in a volume (Coleridge, Shelley, and Keats, for instance, is a favorite combination). Even bardlings like Pollok enjoy a large number of readers and editions. Nor is there—notwithstanding the much-complained-of absence of an international copyright law—any deficiency of home supply for the market. Writing English verses, indeed, is as much a part of an American's education, as writing Latin verses is of an Englishman's,—recited "poems" always holding a prominent place among their public collegiate exercises; about every third man, and every other woman of the liberally-educated classes, writes occasional rhymes, either for the edification of their private circle, or the poet's-corner of some of the innumerable newspapers that encumber the land; and the number of gentlemen and ladies one meets who have published a volume of *Something and Other Poems*, is perfectly astounding.

The true secret seems to be, that the Americans, as a people, have not received that education which enables a people to produce poets. For, however true the *poeta nascitur* adage may be negatively of individuals, it is not true positively of nations. The formation of a national poetic temperament is the work of a long education, and the development of various influences. A peculiar classicality of taste, involving a high critical standard, seems necessary, among the moderns, to high poetic production; and such a taste has not yet been formed in America. True, there are kinds of poetry—the Ballad and the Epic, which, so far as we can trace them, are born, Pallas-like, full-grown; which sound their fullest tone in a nation's infancy, and are but faintly echoed in its maturity. But there are numbers in which lisps the infancy, not of a nation merely, but of a race. And the Americans were an old race though a young nation. They began with too much civilization for the heroic school of poetry; they have not yet attained enough cultivation for the philosophic.

WILLIAM CULLEN BRYANT is, as we learn from Mr. Griswold, about fifty-five years old, and was born in Massachusetts, though his literary career is chiefly associated with New York, of which State he is a resident. With a precocity extraordinary, even in a country where precocity is the rule instead of the ex-

ception, he began to write *and publish* at the age of thirteen, and has, therefore, been full forty years before the American public, and that not in the capacity of poet alone,—having for more than half that period edited the *Evening Post*, one of the ablest and most respectable papers in the United States, and the oldest organ, we believe, of the Democratic party in New York. He has been called, and with justice, a poet of nature. The prairie solitude, the summer evening landscape, the night wind of autumn, the water-bird flitting homeward through the twilight—such are the favorite subjects of inspiration. *Thanatopsis*, one of his most admired pieces, was written at the age of eighteen, and exhibits a finish of style, no less than a maturity of thought, very remarkable for so youthful a production.

Mr. Bryant's poems have been for some years pretty well known on this side the water,—better known, at any rate, than any other Transatlantic verses; on which account, being somewhat limited for space, we forbear to make any extracts from them.

FITZ-GREENE HALLECK is also a New Englander by birth, and a New Yorker by adoption. He is Bryant's contemporary and friend, but the spirit and style of his versification are very different; and so, it is said, are his political affinities. While Bryant is a bulwark of the Democracy, Halleck is reported to be not only an admirer of the obsolete Federalists, but an avowed Monarchist. To be sure, this is only his private reputation: no trace of such a feeling is observable in his writings, which show throughout a sturdy vein of republicanism, social and political. In truth, the party classification of American literary men is apt to puzzle the uninitiated. Thus Washington Irving is said to belong to the Democrats; but it would be hard to find in his writings anything countenancing their claim upon him. His sketches of English society are a panegyric of old institutions; and the fourth book of his *Knickerbocker* is throughout a palpable satire on the administration of Thomas Jefferson, the great apostle of Democracy. Perhaps, however, he may since have changed his views. Willis, too, the "Free Pencil," who has been half his life prating about lords and ladies, and great people, and has become a sort of Jenkins to the fashionable life of New York; he also is one of the Democratic party. Peradventure he may vote the "Locofoco ticket" in the hope of propitiating *the boys* (as the *canaille* of

American cities are popularly called,) and saving his printing-office from the fate of the Italian Opera-house in Astor Place. But what shall we say of Cooper, who, by his anti-democratic opinions, has made himself one of the most unpopular men in his country, and whose recent political novels rival the writings of Judge Haliburton, in the virulence as well as the cleverness of their satire upon Republican institutions? He, too, is a Democrat. To us, who are not behind the curtain, these things are a mystery incapable of explanation. To return to our present subject. Halleck made his *début* in the poetical world by some satirical pieces called *The Croakers*, which created as much sensation at their appearance as the anonymous *Salmagundi* which commenced Irving's literary career. These were succeeded by *Fanny*,—a poem in the *Don Juan* metre. *Fanny* has no particular plot or story, but is a satirical review of all the celebrities, literary, fashionable, and political, of New York, at that day (1821). And the satire was probably very good at the time, and in the place; but, unfortunately for the extent and permanence of its reputation, most of these celebrities are utterly unknown, not merely beyond the limits of the Union, but beyond those of New York. Among all the personages enumerated, we can find but two names that an European reader would be likely to know anything about,—Clinton and Van Buren. Nay, more, in the rapid growth and change of things American, the present generation of New Yorkers are likely to lose sight of the lions of their immediate progenitors; and unless some Manhattanese scholiast should write a commentary on the poem in time, its allusions, and with them most of its wit, will be in danger of perishing entirely. What we *can* judge of in *Fanny* are one or two graceful lyrics interspersed in it, though even these are marred by untimely comicality and local allusions. The nominal hero, while wandering about at night after the wreck of his fortunes, hears a band playing outside a public place of entertainment. It must have been a better band than that which now, from the Museum opposite the Astor House, drives to frenzy the hapless stranger; for it incites the ruined stock-jobber—not the most poetical of characters—to commit verse with this result:—

Young thoughts have music in them, love
And happiness their theme,
And music wanders in the wind
That lulls a morning dream;

And there are angel voices heard
In childhood's frolic hours,
When life is but an April day
Of sunshine and of showers.

There's music in the forest leaves
When summer winds are there,
And in the laugh of forest girls
That braid their sunny hair.
The first wild bird that drinks the dew
From violets of the spring
Has music in his song, and in
The fluttering of his wing.
There's music in the dash of waves
When the swift bark cleaves the foam ;
There's music heard upon her deck,
The mariner's song of home.
When moon and star-beams smiling meet
At midnight on the sea ;
And there is music once a week
In Scudder's balcony.

But the music of young thoughts too soon
Is faint and dies away,
And from our morning dreams we wake
To curse the coming day ;
And childhood's frolic hours are brief.
And oft in after years
Their memory comes to chill the heart,
And dim the eye with tears.

To-day the forest leaves are green.
They'll wither on the morrow ;
And the maiden's laugh be changed ere long
To the widow's wail of sorrow.
Come with the winter snows and ask
Where are the forest-birds ;
The answer is a silent one,
More eloquent than words.

The moonlight music of the waves
In storms is heard no more,
When the living lightning mocks the wreck
At midnight on the shore,
And the mariner's song of home has ceased,
His corse is on the shore.

We will stop here, and refrain from
quoting the unsentimental couplet which
concludes the piece.

In Halleck's subsequent productions, the
influence of Campbell is more perceptible
than that of Byron, and with manifest ad-
vantage. It may be said of his compositions,
as it can be affirmed of few American verses,
that they have a real innate harmony, some-
thing not dependent on the number of sylla-
bles in each line, or capable of being dissect-
ed out into feet, but growing in them, as it
were, and created by the fine ear of the writ-
ter. Their sentiments, too, are exalted and
ennobling ; eminently genial and honest, they
stamp the author for a good man and true,—
Nature's aristocracy. In most of his poems
these pleasing characteristics are conspicuous ;

in none more so than his eulogy on his de-
ceased friend and fellow-poet, Drake :—

Green be the turf above thee,
Friend of my better days ;
None knew thee but to love thee,
None named thee but to praise.

Tears fell, when thou wert dying,
From eyes unused to weep,
And long where thou art lying
Will tears the cold turf steep.
When hearts, whose truth was proven
Like thine, are laid in earth,
There should a wreath be woven
To tell the world their worth.

And I, who woke each morrow
To clasp thy hand in mine,
Who shared thy joy and sorrow,
Whose weal and woe were thine—

It should be mine to braid it
Around thy faded brow ;
But I've in vain essayed it,
And feel I cannot now.

While memory bids me weep thee,
Nor thoughts nor words are free,
The grief is fixed too deeply
That mourns a man like thee.

Spirited and harmonious stanzas these :—

Come to the bridal-chamber, Death !
Come to the mother's, when she feels
For the first time her first-born's breath ;
Come when the blessed seals
Which close the pestilence are broke,
And crowded cities wail its stroke ;
Come in consumption's ghastly form,
The earthquake shock, the ocean storm ;
Come when the heart beats high and warm
With banquet-song, and dance, and wine,
And thou art terrible—the tear,
The groan, the knell, the pall, the bier,
And all we know, or dream, or fear
Of agony, are thine.

But to the hero, when his sword
Has won the battle for the free,
Thy voice sounds like a prophet's word ;
And in its hollow tones are heard
The thanks of millions yet to be.
Come when his task of fame is wrought ;
Come with her laurel-leaf blood-bought ;
Come in her crowning hour, and then
Thy sunken eyes' unearthly light
To him is welcome as the sight
Of sky and stars to prisoned men :

Thy grasp is welcome as the hand
Of brother in a foreign land ;
Thy summons welcome as the cry
That told the Indian isles were nigh
To the world-seeking Genoese,
When the land-winds from woods of palm
And orange-groves, and fields of balm,
Blew o'er the Haytian seas.

LONGFELLOW, the pet poet of Boston, is a much younger man than either Bryant or Halleck, and has made his reputation only within the last twelve years, during which time he has been one of the most noted lions of American Athens. The city of Boston, as every one knows who has been there, or who has met with any book or man emanating from it, claims to be the literary metropolis of the United States, and assumes the slightly-pretending *sobriquet* just quoted. The American Athenians have their thinking and writing done for them by a coterie whose distinctive characteristics are Socinianism in theology, a præter-Puritan prudery in ethics, a German tendency in metaphysics, and throughout all a firm persuasion that Boston is the fountain-head of art, scholarship, and literature for the western world, and particularly that New-York is a Nazareth in such things, out of which can come nothing good. For the Bostonians, who certainly cultivate literature with more general devotion, if not always with more individual success than the New-Yorkers, can never forgive their commercial neighbors for possessing by birth the two most eminent prose-writers of the country—Irving and Cooper, and, by adoption, two of the leading poets, Bryant and Halleck. Nor are the good people of the "Empire State" slow to resent these exhibitions of small jealousy; but, on the contrary, as the way of the world is, they are apt to retort by greater absurdities. So shy are they of appearing to be guided by the dicta of their eastern friends, that to this day there is scarcely man or woman on Manhattan Island who will confess a liking for Tennyson, Mrs. Barrett Browning, or Robert Browning, simply because these poets were taken up and patronized (metaphorically speaking, of course) by the "Mutual Admiration Society of Boston."

The immediate influences of this *camaraderie* are highly flattering and apparently beneficial to the subject of them, but its ultimate effects are most injurious to the proper development of his powers. When the merest trifles that a man throws off are inordinately praised, he soon becomes content with producing the merest trifles. Longfellow has grown unaccustomed to do himself justice. Half his volumes are filled up with translations; graceful and accurate, indeed; but translations, and often from originals of very moderate merit. His last original poem, *Evangeline*,* is a sort of pastoral in hexameters. The resuscitation of this classical

metre had a queer effect upon the American quidnuncs. Some of the *critics* evidently believed it to be a bran-new metre invented for the nonce by the author, a delusion which they of the "Mutual Admiration" rather winked at; and the parodists who endeavored to ridicule the new measure were evidently not quite sure whether seven feet or nine made a hexameter.

It is really to be regretted that Longfellow has been cajoled into playing these tricks with himself, for his earlier pieces were works of much promise, and, had they been orthily followed out, might have entitled him to a high place among the poets of the language. Take, as a specimen, this delicious bit of quiet landscape, which opens the prelude to his *Voices of the Night*:—

Pleasant it was, when woods were green,
And winds were soft and low,
To lie amid some sylvan scene,
Where, the long drooping boughs between,
Shadows dark and sunlight sheen
Alternate come and go;

Or where the denser grove receives
No sunlight from above,
But the dark foliage interweaves
In one unbroken roof of leaves,
Underneath whose sloping eaves
The shadows hardly move.

Beneath some patriarchal tree
I lay upon the ground;
His hoary arms uplifted he,
And all the broad leaves over me
Clapped their little hands in glee
With one continuous sound—

A slumberous—a sound that brings
The feelings of a dream;
As of innumerable wings.
As, when a bell no longer swings,
Faint the hollow murmur rings
O'er meadow, lake, and stream.

And dreams of that which cannot die,
Bright visions, came to me,
As lapped in thought I used to lie
And gaze into the summer sky,
Where the sailing clouds went by,
Like ships upon the sea.

Most of his poems have a vein of melancholy—not despairing, but resigned—melancholy running through them: their general tone and moral may be summed up in two of his own lines:—

Know how sublime a thing it is
To suffer and be strong.

Of such a cast is

The Goblet of Life.

Filled is life's goblet to the brim;
And though my eyes with tears are dim,

* See *Fraser's Magazine* for March, 1848, p. 295.

I see its sparkling bubbles swim,
And chant a melancholy hymn
With solemn voice and slow.

No purple flowers, no garlands green,
Conceal the goblet's shade or sheen;
Nor maddening draughts of Hippocrene,
Like gleams of sunshine, flash between
Thick leaves of mistletoe.

This goblet, wrought with curious art,
Is filled with waters that upstart
When the deep fountains of the heart,
By strong convulsions rent apart,
Are running all to waste.

And as it mantling passes round,
With fennel is it wreathed and crowned,
Whose seed and foliage, sun-imbrowned,
Are in its waters steeped and drowned,
And give a bitter taste.

Above the lowly plants it towers,
The fennel with its yellow flowers,
And in an earlier age than ours
Was gifted with the wondrous powers
Lost vision to restore.

It gave new strength and fearless mood,
And gladiators fierce and rude
Mingled it with their daily food;
And he who battled and subdued
A wreath of fennel wore.

Then in Life's goblet freely press
The leaves that give it bitterness,
Nor prize the colored waters less,
For in thy darkness and distress
New light and strength they give!

And he who has not learned to know
How false its sparkling bubbles show,
How bitter are the drops of woe
With which its brim may overflow,
He has not learned to live.

* * * *

O suffering, sad humanity!
O ye afflicted ones, who lie
Steeped to the lips in misery,
Longing, and yet afraid to die,
Patient, though sorely tried!

I pledge you in this cup of grief,
Where floats the fennel's bitter leaf,
The battle of our life is brief,
The alarm—the struggle—the relief—
Then sleep we side by side.

Longfellow's poetry, whenever he really lays himself out to write poetry, has a definite idea and purpose in it—no small merit now-a-days. His versification is generally harmonious, and he displays a fair command of metre. Sometimes he takes a fancy to an obsolete or out-of-the-way stanza; one of his

longest and best poems, *The Skeleton in Armor*, is exactly in the measure of Drayton's fine ballad on Agincourt,—

Fair stood the wind for France,
When we our sails advance,
Nor here to prove our chance
Longer would tarry, &c.

His chief fault is an over-fondness for simile and metaphor. He seems to think indispensable the introduction into everything he writes of a certain (or sometimes a very uncertain) number of these figures. Accordingly his poems are crowded with comparisons, sometimes very pretty and pleasing, at others so far-fetched that the string of tortured images which lead off Alfred de Musset's bizarre *Ode to the Moon* can hardly equal them. *Endymion*, a very sweet little poem, begins thus:—

The rising moon has hid the stars;
Her level rays, like golden bars,
Lie on the landscape green,
With shadows brown between.
And silver-white the river gleams,
As if *Diana in her dreams*
Had dropt her silver bow
Upon the meadows low.

In *Evangeline* the stars are "the thoughts of God in the heavens," and the trees wrestle with the wind "like Jacob of old with the angel;" and in another poem the moon going up among the stars is compared to a virgin martyr treading an ordeal through bars of hot iron! But indeed this *making figures* (whether from any connection with the calculating habits of the people or not) is a terrible propensity of American writers, whether of prose or verse. Their orators are especial sinners in this respect. We have seen speeches stuck as full of metaphors (more or less mixed) as Burton's *Anatomy* is of quotations.

Such persons as know from experience that literary people are not always in private life what their writings would betoken, that Miss Bunions do not precisely resemble March violets, and mourners upon paper may be laughers over mahogany—such persons will not be surprised to hear that the Longfellow is a very jolly fellow, a lover of fun and good dinners, and of an amiability and personal popularity that have aided not a little the popularity of his writings in verse and prose—for he writes prose too, prettier, quainter, more figurative, and more poetic if anything, than his poetry. He is also a professor at Harvard College, near Boston.

EDGAR A. POE, like Longfellow and most of the other American poets, wrote prose as well as poetry, having produced a number of wild, grotesque, and powerfully-imagined tales; unlike most of them, he was a literary man *pur sang*. He depended for support entirely on his writings, and his career was more like the precarious existence of an author in the time of Johnson and Savage than the decent life of an author in our own day. He was a Southerner by birth, acquired a liberal education, and what the French call "expansive" tastes, was adopted by a rich relative, quarreled with him, married "for love," and lived by editing magazines in Richmond, Philadelphia, and New York; by delivering lectures (the never-failing last resort of the American literary adventurer); by the occasional subscriptions of compassionate acquaintances or admiring friends—any way he could—for eighteen or nineteen years: lost his wife, involved himself in endless difficulties, and finally died in what should have been the prime of his life, about six months ago. His enemies attributed his untimely death to intemperance; his writings would rather lead to the belief that he was an habitual taker of opium. If it make a man a poet to be

Dowered with the hate of hate, the scorn of
scorn,
The love of love,

Poe was certainly a poet. Virulently and ceaselessly abused by his enemies (who included a large portion of the press), he was worshiped to infatuation by his friends. The severity of his editorial criticisms, and the erratic course of his life, fully account for the former circumstance; the latter is probably to be attributed, in part at least, to pity for his mishaps.

If Longfellow's poetry is best designated as quaint, Poe's may most properly be characterized as fantastic. The best of it reminds one of Tennyson, not by any direct imitation of particular passages, but by its general air and tone. But he was very far from possessing Tennyson's fine ear for melody. His skill in versification, sometimes striking enough, was evidently artificial: he overstudied metrical expression, and over-rated its value so as sometimes to write what were little better than nonsense-verses, for the sake of the rhythm. He had an incurable propensity for refrains, and when he had once caught a harmonious cadence, appeared to think it could not be too often repeated.

Poe's name is usually mentioned in connection with *The Raven*, a poem which he published about five years ago. It had an immense run, and gave rise to innumerable parodies—those tests of notoriety if not of merit. And certainly it was not without a peculiar and fantastic excellence in the execution, while the conception is highly striking and poetic. The author in his lonely chamber, mourning over his lost love and his departed hopes, and vainly seeking comfort in pondering

Over many a quaint and curious volume of forgotten lore,

is aroused by what he takes for the knock of a visitor at his door. But no visitor is there. While perplexed by the mysterious knocking, he hears the sound repeated, and this time evidently at the window, to which unwonted place of ingress he accordingly betakes himself:—

Open wide I flung the shutter, when, with many a
flirt and flutter,
In there stepped a stately *raven* of the saintly days
of yore.

Not the least obeisance made he, not an instant
stopped or stayed he,

But with mien of lord or lady perched above my
chamber door—

Perched upon a bust of Pallas just above my
chamber door—

Perched and sat, and nothing more.

Half-amused and half-excited by this eccentric appearance, the student makes bold to question the "ungainly bird" as to his name and errand,—not so unreasonable a proceeding, since ravens sometimes talk; and this one talks to the extent of one word, "Nevermore," which it pertinaciously repeats in answer to every query, and the sad negation falls chilling and ominous on all the desolate man's hopes of forgetfulness or consolation:—

For the raven, sitting lonely on the placid bust,
spoke only

That one word, as if his soul in that one word he
did outpour.

Nothing further then he uttered, not a feather
then he fluttered,

Till I scarcely more than muttered, "Other friends
have flown before.

On the morrow *he* will leave me as my hopes have
flown before."

Then the bird said, "Nevermore."

Startled at the stillness broken by reply so aptly
spoken,

"Doubtless," said I, "what it utters is its only
stock and store,

Caught from some unhappy master whom unmerciful disaster
Followed fast and followed faster till his songs one burden bore,
Till the dirges of his hope that melancholy burden bore,
Of never—nevermore.”

* * * * *

And the raven, never flitting, still is sitting, still is sitting
On the pallid bust of Pallas just above my chamber door;
And his eyes have all the seeming of a demon's that is dreaming,
And the lamplight o'er him streaming throws his shadow on the floor,
And my soul from out that shadow that lies floating on the floor
Shall be lifted nevermore!

The peculiar versification of the poem—showy and not ineffective—is exhibited in the above stanzas. The metre is a modification of that used in the conclusion of Miss Barrett's *Lady Geraldine*. This is evident, not merely from a general comparison of the two, but from some particular resemblances of rhyme and phrase, *e. g.* :—

*With a murmurous, stir uncertain, in the air the purple curtain
Swelleth in and swelleth out around her motionless pale brows,
While the gliding of the river sends a rippling noise for ever
Through the open casement whitened by the moonlight's slant repose.—Lady Geraldine.*

*And the silken, sad, uncertain rustling of each purple curtain
Thrilled me, filled me with fantastic terrors never felt before,
So that now to still the beating of my heart, I stood repeating,
'Tis some visitor entreating entrance at my chamber door.—The Raven.*

The triple rhyme is introduced from one of his earlier ballads—a rather pretty one—on a girl who has forgotten her dead lover, and sold herself for rank and wealth :—

And thus they said I plighted
An irrevocable vow,
And my friends are all delighted
That his love I have requited,
And my mind is much benighted
If I am not happy now.

* * * * *

Would God I could awaken!
For I dream—I know not how.
And my soul is sorely shaken
Lest an evil step be taken,
And the dead who is forsaken
May not be happy now.

And his weakness for refrain induced the repetition of the last line in each verse.

This much notice seems due to a poem which created such a sensation in the author's country.

THE HAUNTED PALACE.

In the greenest of our valleys
By good angels tenanted,
Once a fair and stately palace—
Radiant palace—reared its head.
In the monarch Thought's dominion
It stood there!
Never seraph spread a pinion
Over fabric half so fair.

Banners yellow, glorious, golden,
On its roof did float and flow,
(This—all this—was in the olden
Time, long ago).

* * * * *

Wanderers in that happy valley
Through two luminous windows saw
Spirits moving musically
To a lute's well-tuned law,
Round about a throne where, sitting
(Porphyrogene!)
In state his glory well-befitting,
The ruler of the realm was seen.

And all with pearl and ruby glowing
Was the fair palace door,
Through which came flowing, flowing, flowing,
And sparkling evermore,
A troop of Echoes, whose sweet duty
Was but to sing,
In voices of surpassing beauty,
The wit and wisdom of their king.

But evil things in robes of sorrow
Assailed the monarch's high estate,
(Ah, let us mourn! for never morrow
Shall dawn upon him desolate!)
And round about his home the glory
That blushed and bloomed
Is but a dim-remembered story
Of the old time entombed.

And travelers now, within that valley,
Through the red-lit windows see
Vast forms that move fantastically
To a discordant melody;
While like a ghastly rapid river,
Through the pale door
A hideous throng rush out for ever,
And laugh—but smile no more.

In the very same volume with this are some verses that Poe wrote when a boy, and some that a boy might be ashamed of writing. Indeed, the secret of rejection seems to be little known to Transatlantic bards:

And now as the night was senescent,
And star-dials hinted of morn,
In front of our path a liquescent
And nebulous lustre was borne,

Out of which a miraculous crescent
Arose with a duplicate horn,
Astarte's bediamonded crescent,
Distinct with its duplicate horn.

And I said, "She is warmer than Dian,
She rolls through an ether of sighs,
She has seen that the tears are not dry on
These cheeks where the worm never dies,
And has come past the stars of the Lion
To point us the path to the skies,
To the Lethæan peace of the skies;
Come up, in despite of the Lion,
To shine on us with her bright eyes;
Come up, through the lair of the lion,
With love in her luminous eyes."

The rhyme of these lines may be good enough, but where is the reason of them?

Though Poe was a Southerner, his poetry has nothing in it suggestive of his peculiar locality. It is somewhat remarkable that the slaveholding, which has tried almost all other means of excusing or justifying itself before the world, did not think of "keeping a poet," and engaging the destitute author from its own territory to sing the praises of "the patriarchal institution." And it would have been a fair provocation that the Abolitionists had their poet already. Indeed, several of the northern poets have touched upon this subject; Longfellow, in particular, has published a series of spirited and touching anti-slavery poems; but the man who has made it his *specialité* is JOHN GREENLEAF WHITTIER, a Quaker, literary editor of the *National Era*, an Abolition and ultra-Radical paper, which, in manful despite of Judge Lynch, is published at Washington, between the slave-pens and the capitol. His verses are certainly obnoxious to the jurisdiction of that notorious popular potentate, being unquestionably "inflammatory, incendiary, and insurrectionary," as the Southern formula goes, in a very high degree. He makes passionate appeals to the Puritan spirit of New England, and calls on her sons to utter their voice,—

From all her wild green mountains,
From valleys where her slumbering fathers lie,
From her blue rivers and her welling fountains,
And clear cold sky—
From her rough coasts, and isles, which hungry
Ocean
Gnaws with his surges—from the fisher's skiff,
With white sail swaying to the billow's motion
Round rock and cliff—
From the free fireside of her unbought farmer,
From her free laborer at his loom and wheel,
From the brown smithy where, beneath the
hammer,
Ring the red steel—

From each and all, if God hath not forsaken
Our land and left us to an evil choice;—

and protest against the shocking anomaly of slavery in a free country. At times, when deploring the death of some fellow-laborer in the cause, he falls into a somewhat subdued strain, though even then there is more of spirit and fire in his verses than one naturally expects from a follower of George Fox; but on such occasions he displays a more careful and harmonious versification than is his wont. There is no scarcity of these elegies in his little volume, *The Abolitionists*, even when they escape the attentions of the high legal functionary already alluded to, not being apparently a long-lived class.

One of his best pieces is founded on the fearful story (already commemorated in verse by Milman) of the slave-ship smitten by ophthalmia. The crew, after throwing over their diseased cargo, nevertheless all lost their sight except one man, on the preservation of whose vision their fate depended.

Red glowed the western waters—
The setting sun was there,
Scattering alike on wave and cloud
His fiery mesh of hair.
Amidst a group in blindness
A solitary eye
Gazed from the burdened slaver's deck
Into that burning sky.

"A storm," spoke out the gazer,
"Is gathering and at hand—
Curse on't—I'd give my other eye
For one firm rood of land."
And then he laughed; but only
His echoed laugh replied,
For the blinded and the suffering
Alone were at his side.

Night settled on the waters,
And on a stormy heaven,
While fiercely on that lone ship's track
The thunder-gust was driven.
"A sail! Thank God, a sail!"
And as the helmsman spoke
Up through the stormy murmur
A shout of gladness broke.

Down came the stranger vessel,
Unheeding on her way,
So near, that on the slaver's deck
Fell off the driven spray.
"Ho! for the love of mercy—help!
We're perishing and blind!"
A wail of utter agony
Came back upon the wind.

"Help us! for we are stricken
With blindness every one;
Ten days we've floated fearfully
Unnoting star or sun.

Our ship's the slaver Leon—
We're but a score on board—
Our slaves are all gone over—
Help, for the love of God!"

On livid brows of agony
The broad red lightning shone,
But the roar of wind and thunder
Stifled the answering groan.
Wailed from the broken waters
A last despairing cry,
As, kindling in the stormy light,
The stranger ship went by.

Toujours perdrix palls in poetry as in cookery; we grow tired after awhile of invectives against governors of slave-states and mercenary parsons, and dirges for untimely perished Abolitionists. The wish suggests itself that Whittier would not always

Give up to a party what is meant for mankind, but sometimes turn his powers in another direction. Accordingly, it is a great relief to find him occasionally trying his hand on the early legends of New-England and Canada, which do not suffer in such ballads as this:—

"To the winds give our banner!
Bear homeward again!"
Cried the lord of Acadia,
Sir Charles of Estienne.
From the prow of his shallop
He gazed as the sun
From his bed in the ocean
Streamed up the St. John.

O'er the blue western waters
That shallop had passed,
Where the mists of Penobscot
Clung damp on her mast.
St. Saviour had looked
On the heretic sail,
As the songs of the Huguenot
Rose on the gale.

The pale, ghostly fathers
Remembered her well,
And had cursed her while passing
With taper and bell.
But the men of Monhegan,
Of Papists abhorred,
Had welcomed and feasted
The Huguenot lord.

* * * * *

O'er the Isle of the Pheasant
The morning sun shone,
On the plane-trees which shaded
The shores of St. John.
"Now why from yon battlements
Speaks not my love?
Why waves there no banner
My fortress above?"

Dark and wild from his deck
St. Estienne gazed about
On fire-wasted dwellings
And silent redoubt.
From the low, shattered walls,
Which the flame had o'errun,
There floated no banner,
There thundered no gun!

But beneath the low arch
Of its door-way there stood
A pale priest of Rome
In his cloak and his hood.
With the bound of a lion
Latour sprang to land,
On the throat of the Papist
He fastened his hand.

"Speak, son of the woman
Of scarlet and sin!
What wolf has been prowling
My castle within?"
From the grasp of the soldier
The Jesuit broke;
Half in scorn, half in sorrow,
He smiled as he spoke:

"No wolf, Lord of Estienne,
Has ravished thy hall,
But the men of De Aulney,
With fire, steel, and ball.
On an errand of mercy
I hitherward came,
While the walls of thy castle
Yet spouted with flame.

Pentagoet's dark vessels
Were moored in the bay,
Grim sea-lions, roaring
Aloud for their prey."
"But what of my lady?"
Cried Charles of Estienne.
"On the shot-crumbled turret
My lady was seen.

Half veiled in the smoke-cloud,
Her hand grasped the pennon,
While her dark tresses swayed
In the hot breath of cannon.
But woe to the heretic,
Evermore woe!
When the son of the Church
And the Cross is his foe.

In the track of the shell,
In the path of the ball,
De Aulney swept over
The breach of the wall.
Steel to steel, gun to gun,
One moment—and then
Alone stood the victor,
Alone with his men.

Of its sturdy defenders
My lady alone
Saw the cross and the lilies
Float over St. John."

"Let the dastard look to it!"
Cried fiery Estienne;
"Were De Aulney King Louis,
I'd free her again!"

"Alas for thy lady!
No service from thee
Is needed by her
Whom the Lord hath set free.
Nine days in stern silence
Her thralldom she bore,
But the tenth morning came
And death opened her door."

* * * * *

O the loveliest of heavens
Hung tenderly o'er him,
There were waves in the sunshine
And green isles before him;
But a pale hand was beckoning
The Huguenot on,
And in blackness and ashes
Behind lay St. John.

We have been rather liberal in our extracts from Whittier, because he is less known than several other Western bards to the English reader, and because we think him entitled to stand higher on the American Parnassus than most of his countrymen would place him. His faults—harshness and want of polish—are evident; but there is more life, and spirit, and soul in his verses, than in those of eight-ninths of Mr. Griswold's immortal ninety.

But within the last three years there has arisen in the United States a satirist of genuine excellence, who, however, besides being but moderately appreciated by his countrymen, seems himself, in a great measure, to have mistaken his real forte. JAMES RUSSELL LOWELL, one of the Boston coterie, has for some time been publishing verses, which are by the coterie duly glorified, but which are in no respect distinguishable from the ordinary level of American poetry, except that they combine an extraordinary pretension to originality, with a more than usually palpable imitation of English models. Indeed, the failure was so manifest, that the American literati seem, in this one case, to have rebelled against Boston dictation; and there is sufficient internal evidence that such of them as do duty for critics handled Mr. Lowell pretty severely. Violently piqued at this, and simultaneously conceiving a disgust for the Mexican war, he was impelled by both feelings to take the field as a satirist: to the former, we owe the *Fable for Critics*; to the latter, the *Biglow Papers*. It was a happy move, for he has the rare faculty of writing *clever doggerel*. Take out the best

of *Ingoldsby*, Campbell's rare piece of fun, *The Friars of Dijon*, and perhaps a little of Walsh's *Aristophanes*, and there is no contemporary verse of the class with which Lowell's may not fearlessly stand a comparison; for, observe, we are not speaking of mock heroics like Bon Gaultier's, which are only a species of parody, but of real doggerel, the Rabelaisque of poetry. The *Fable* is somewhat on the *Ingoldsby* model,—that is to say, a good part of its fun consists in queer rhymes, double, treble, or polysyllabic; and it has even Barham's fault—an occasional over-consciousness of effort, and calling on the reader to admire, as if the *tour de force* could not speak for itself: *e. g.*—

"So whenever he wished to be quite irresistible,
Like a man with eight trumps in his hand at a
whist-table
(*I feared me at first that the rhyme was untwistable,*
Though I might have lugged in an allusion to
Cristabel").

But *Ingoldsby's* rhymes will not give us a just idea of the *Fable* until we superadd Hook's puns; for the fabulist has a pleasant knack of making puns—outrageous and unhesitating ones—exactly of the kind to set off the general style of his verse. The sternest critic could hardly help relaxing over such a bundle of them as are contained in Apollo's lament over the "treeification" of his Daphne.

"My case is like Dido's," he sometimes remarked,
"When I last saw my love she was fairly embarked;
Let hunters from me take this saw when they need it,
You're not always sure of your game when you've treed it.
Just conceive such a change taking place in one's mistress!
What romance would be left? Who can flatter or kiss trees?
Not to say that the thought would for ever intrude
That you've less chance to win her the more she is wooed.
Ah, it went to my heart, and the memory still grieves,
To see those loved graces all taking their leaves;
Those charms beyond speech, so enchanting but now,
As they left me for ever, each making its bough.
If her tongue had a tang [twang?] sometimes more than was right,
Her new bark is worse than ten times her old bite."

Or, in this catalogue of a graveyard and its contents,—

"There lie levelers leveled, duns done up of themselves,
 There are booksellers finally laid on their shelves,
 Horizontally there lie upright politicians,
 Dose-a-dose with their patients sleep faultless physicians;
 There are slave-drivers quietly whipt under ground,
 There bookbinders, done up in boards, are fast bound.
 There the babe that's unborn is supplied with a berth,
 There men without legs get their six feet of earth,
 There lawyers repose, each wrapt up in his case;
 There seekers of office are sure of a place.
 There defendant and plaintiff are equally cast,
 There shoemakers quietly stick to their last,
 There brokers at length become silent as stocks,
 There stage-drivers sleep without quitting their box."

The *Fable* is a sort of review in verse of American poets. Much of the Boston leaven runs through it; the wise men of the East are all glorified intensely, while Bryant and Halleck are studiously depreciated.

The *Biglow Papers* are imaginary epistles from a New-England farmer, and contain some of the best specimens extant of the "Yankee," or New-England dialect,—better than Haliburton's, for Sam Slick sometimes mixes Southern, Western, and even English vulgarities with his Yankee. Mr. Biglow's remarks treat chiefly of the Mexican war, and subjects immediately connected with it, such as slavery, truckling of northerners to the south, &c. The theme is treated in various ways with uniform bitterness. Now he sketches a "Pious Editor's Creed," almost too daring in its Scriptural allusions, but terribly severe upon the venal fraternity, whose unvirtuous indignation must have been greatly moved by the stout satire of lines like these,—

I du believe with all my soul
 In the great Press's freedom,
 To pint the people to the goal,
 And in the traces lead 'em;
 Palsied the arm that forges yokes,
 At my fat contracts squintin',
 An' withered be the nose that pokes
 Inter the guv'ment printin'!

I du believe thet I should give
 Wut's hisn unto Cæsar,
 Fer it's by him I move and live,
 Frum him my bread and cheese ar.

I du believe thet all o' me
 Duth bear his superscription,
 Will, conscience, honor, honesty,
 An' things o' that description.

In short, I firmly du believe
 In Humbug generally,
 Fer it's a thing I du perceive
 To hev a solid vally.
 This heth my faithful shepherd been,
 In pasturs sweet heth led me,
 And this 'll keep the people green
 To feed ez they hev fed me.

But best of all are the letters of his friend the returned volunteer, Mr. Birdofredom Sawyer, who draws a sad picture of the private soldier's life in Mexico. He had gone out with hopes of making his fortune.

Afore I vullinteed I thought this country wnz a sort o'
 Canaan, a reg'lar Promised Land that flowed with rum an' water;
 Ware propaty grew up like time, without no cultivation,
 An' gold was dug ez taters be among our Yankee nation;
 Ware nateral advantages wuz puffictly amazin',
 Ware every rock that wuz about with precious stuns wuz blazin',
 Ware mill-sites filled the country up ez thick ez you could cram 'em,
 An' desput rivers ran about a-beggin' folks to dam 'em;
 Thet there were meetin'-houses too, chock full o' gold an' silver,
 Thet you could take, an' no one couldn't hand ye in no bill for.
 Thet's wut I thought afore I went, thet's wut the fellers told us,
 Thet stayed to hum, an' speechified, an' to the buzzards sold us.

But it is time to bring this notice to a close—not, however, that we have by any means exhausted the subject. For have we not already stated that there are, at the lowest calculation, ninety American poets, spreading all over the alphabet, from Allston, who is unfortunately dead, to Willis, who is fortunately living, and writing *Court Journals* for the "Upper Ten Thousand," as he has named the quasi-aristocracy of New York? And the lady-poets—the poetesses, what shall we say of them? Truly it would be ungallant to say anything ill of them, and invidious to single out a few among so many; therefore, it will be best for us to say—nothing at all about any of them.

JUN 24 1949

